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STUFF we love

BY MARK PETERSEN editors@thefamilyhandyman.com

High-end sinks with low prices

I was at the International Builders' Show in Vegas last winter and came across the Mr. Sinks & Faucets booth. What caught my eye was the massive selection of vessel and conventional vanity sinks made from every material imaginable. And I couldn't believe how inexpensive they were. There was a glass vessel sink for less than $30 and a large rectangular solid granite unit for $219. The company, MR Direct International, has a huge selection of frugally priced kitchen sinks and faucets as well.

The reps explained that the low prices were the result of having no stores or middlemen, just a giant warehouse in Toledo, OH. So if you're nosing around for a faucet or sink, check out the collection at mrdirectint.com or call (877) 946-5725 and request a catalog.

Travis Larson, Senior Editor

MR DIRECT INTERNATIONAL

THE FAMILY Handyman

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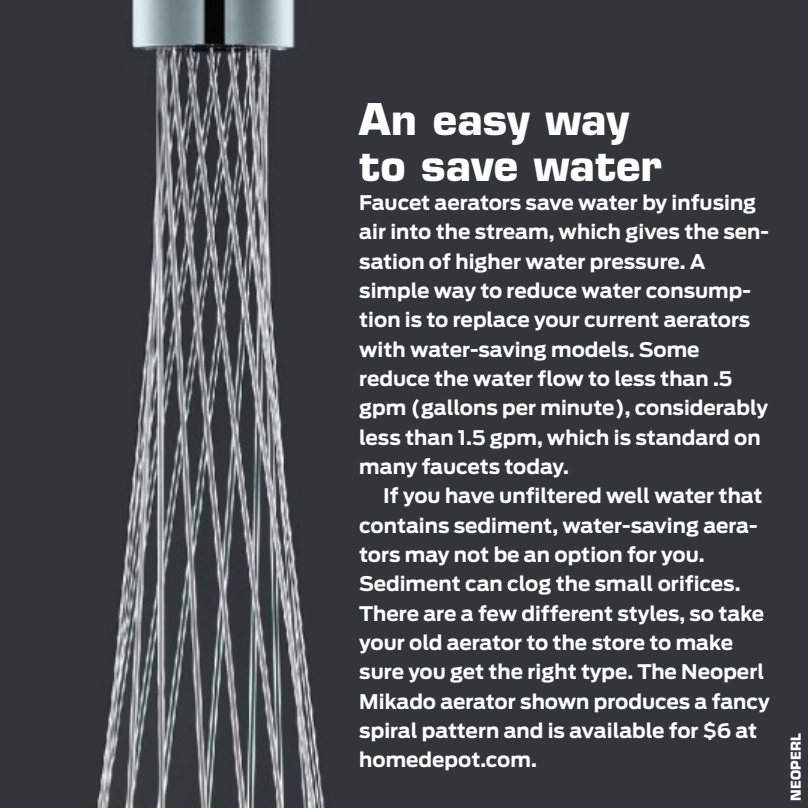

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An easy way to save water

Faucet aerators save water by infusing air into the stream, which gives the sensation of higher water pressure. A simple way to reduce water consumption is to replace your current aerators with water-saving models. Some reduce the water flow to less than .5 gpm (gallons per minute), considerably less than 1.5 gpm, which is standard on many faucets today.

If you have unfiltered well water that contains sediment, water-saving aerators may not be an option for you. Sediment can clog the small orifices. There are a few different styles, so take your old aerator to the store to make sure you get the right type. The Neoperl Mikado aerator shown produces a fancy spiral pattern and is available for $6 at homedepot.com.

A BETTER TOILET PAPER HOLDER

My wife recently brought home a pivoting toilet paper holder, which reaffirmed my long-held belief that it's the little things in life that make us happy. The holder has a pivoting arm that lifts up but stays attached. That means no more chasing spring-loaded rollers around the bathroom floor. Buy this type of paper holder, made by a variety of manufacturers, at home centers or online. The Moen model we bought cost $26.

Mark Petersen, Associate Editor

RYOBI

Clear drainpipes like a pro

Professional drain augers cost anywhere from $300 to well over $1,000. That's just not in the price range of most homeowners, even for us hard-core DIYers. But now every homeowner with finicky drainpipes can play professional plumber with Ryobi's new battery-operated Drain Auger. It runs on an 18-volt ONE+ battery and costs less than $60 (for the tool only). That's about half of what a plumber would charge just for showing up at your door. You'll find them at The Home Depot or homedepot.com.

MOEN

Magnetic showerhead

The Moen Magnetix handheld shower is secured to the shower arm with a magnet rather than a clip. That's quick and slick for me, but even better for my daughter, who can't reach quite high enough to remove a standard shower wand. Aside from allowing her to shower "like a grown-up," the Magnetix line offers adjustable spray patterns and water-saving engineering. We've had ours for a year and wouldn't give it up. Magnetix handheld showers are available in stores and online, starting at about $65.

Gary Wentz, Editor-in-Chief

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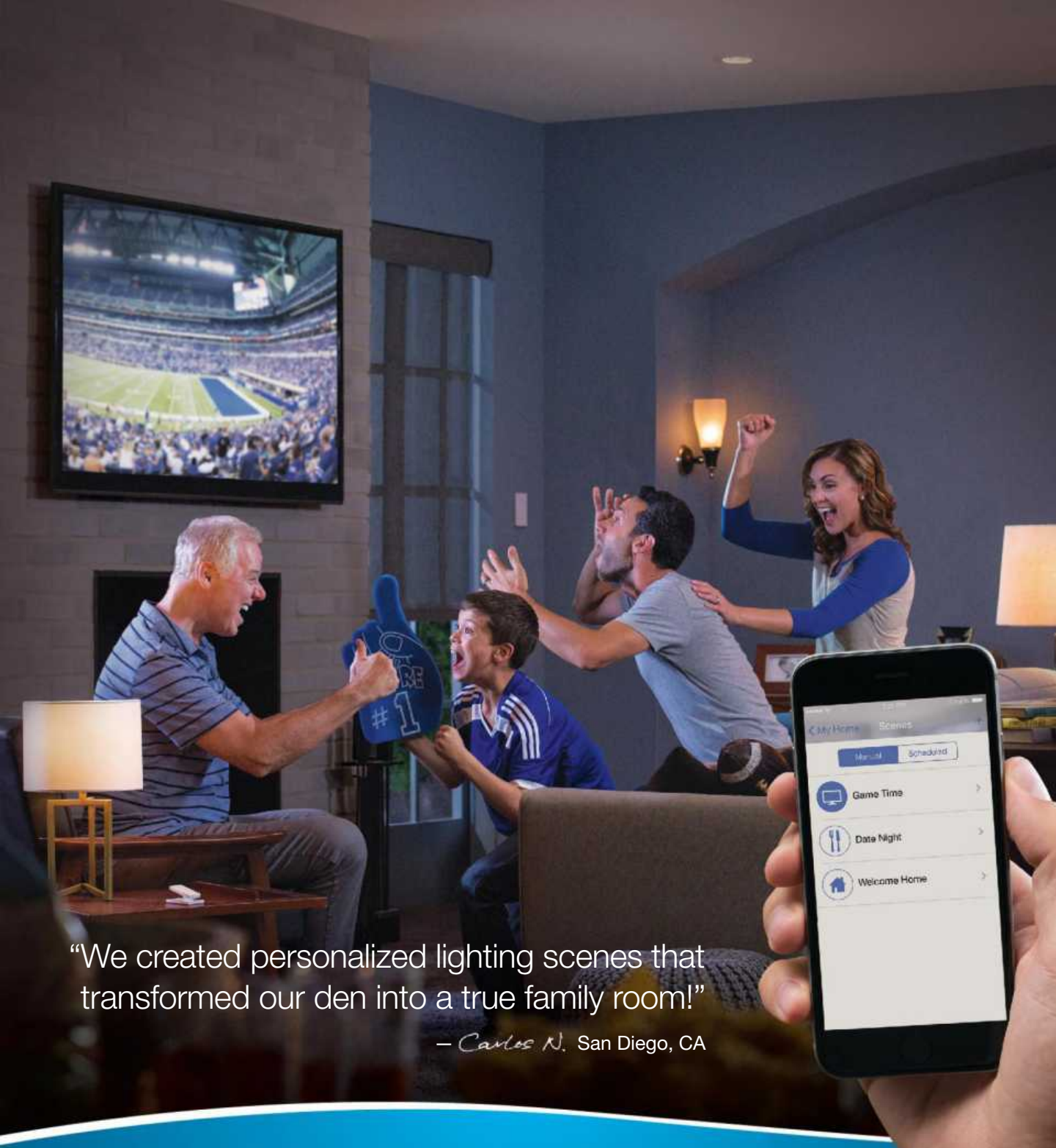

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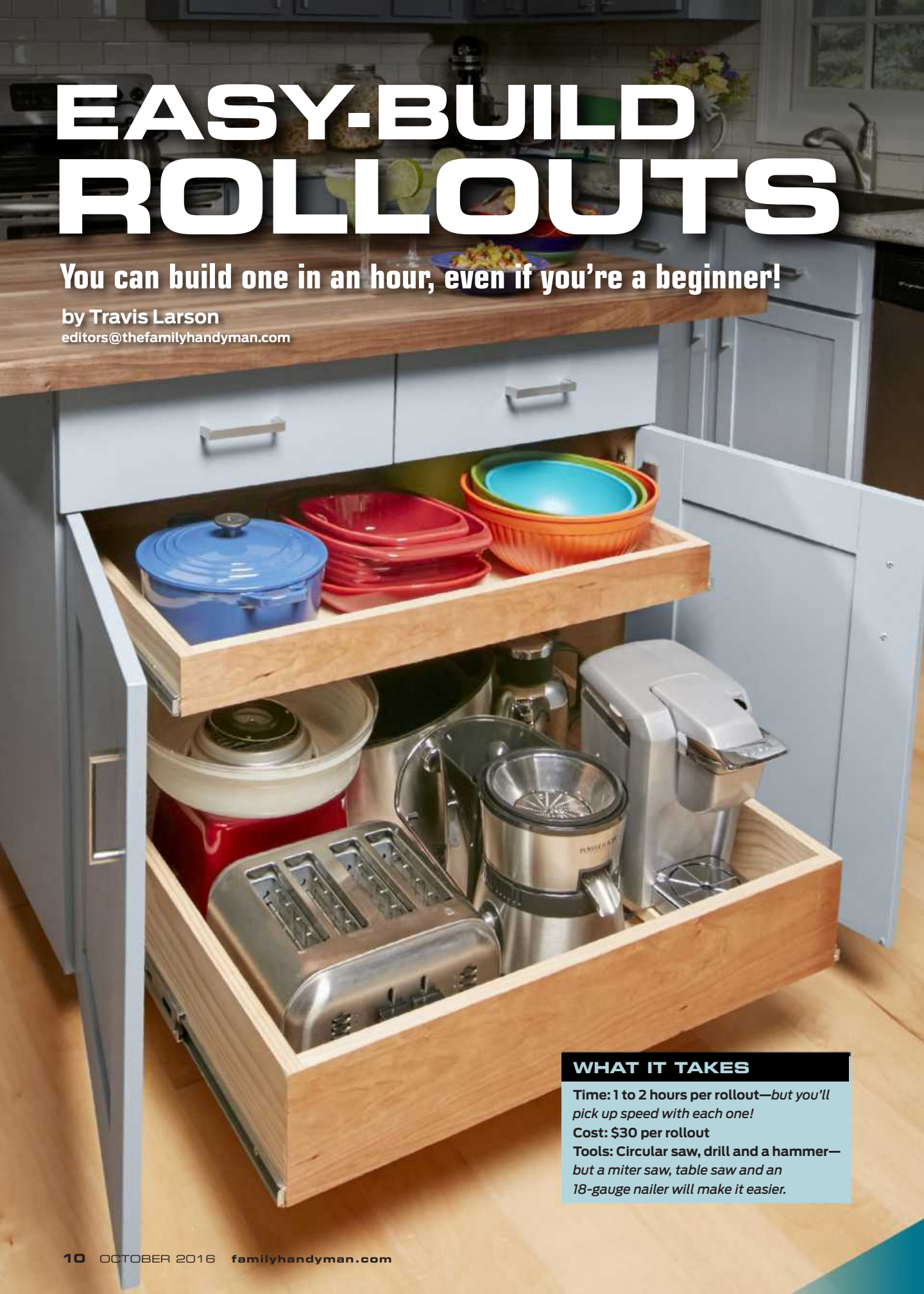
EASY-BUILD ROLLOUTS

You can build one in an hour, even if you're a beginner!

by Travis Larson
editors@thefamilyhandyman.com



WHAT IT TAKES

Time: 1 to 2 hours per rollout—*but you'll pick up speed with each one!*
Cost: $30 per rollout
Tools: Circular saw, drill and a hammer—*but a miter saw, table saw and an 18-gauge nailer will make it easier.*

If you're tired of getting down on all fours and rooting through dark, jumbled base cabinets to find what you need, this project is for you. Rollouts make it easy to organize and access everything from your pantry items and cookware in the kitchen to the power tools and finish cans in your shop.

I've built many rollouts for my house and workshop, and believe me, the conventional way of building rollouts is tricky, time-consuming and frustrating. With the easier method shown here, you can build the rollouts on your workbench using just a few measurements taken from each cabinet.

Plan the rollouts

Before you build anything, decide what you'll be storing in each rollout. I lay out the items to determine the height of the drawer sides and to plan for clearance at the top (**Photo 1**). That will let you know how many rollouts are possible in each cabinet and exactly how high to place the cleats (**Photo 10**).

Buying the materials

Study **Figure A** to understand the construction. Since each cabinet is unique, the quantities of each material will vary. You'll have to measure your cabinets and plan your rollouts to figure out a materials list before you go to the home center. But the basic recipe is the same no matter what size rollouts you're building. Each unit requires a pair of 22-in. side-mount drawer slides (**Photos 6 and 7**). And each

MEET THE EXPERT

Travis Larson, senior editor, has been tinkering with dozens of rollouts over the last 25 years.

1 PLAN AROUND YOUR TYPICAL CONTENTS
Stage the items you wish to store on rollouts until you're satisfied with the heights and quantity of the drawers. Note the clearance heights needed to get the spacing and positioning correct in the cabinet.

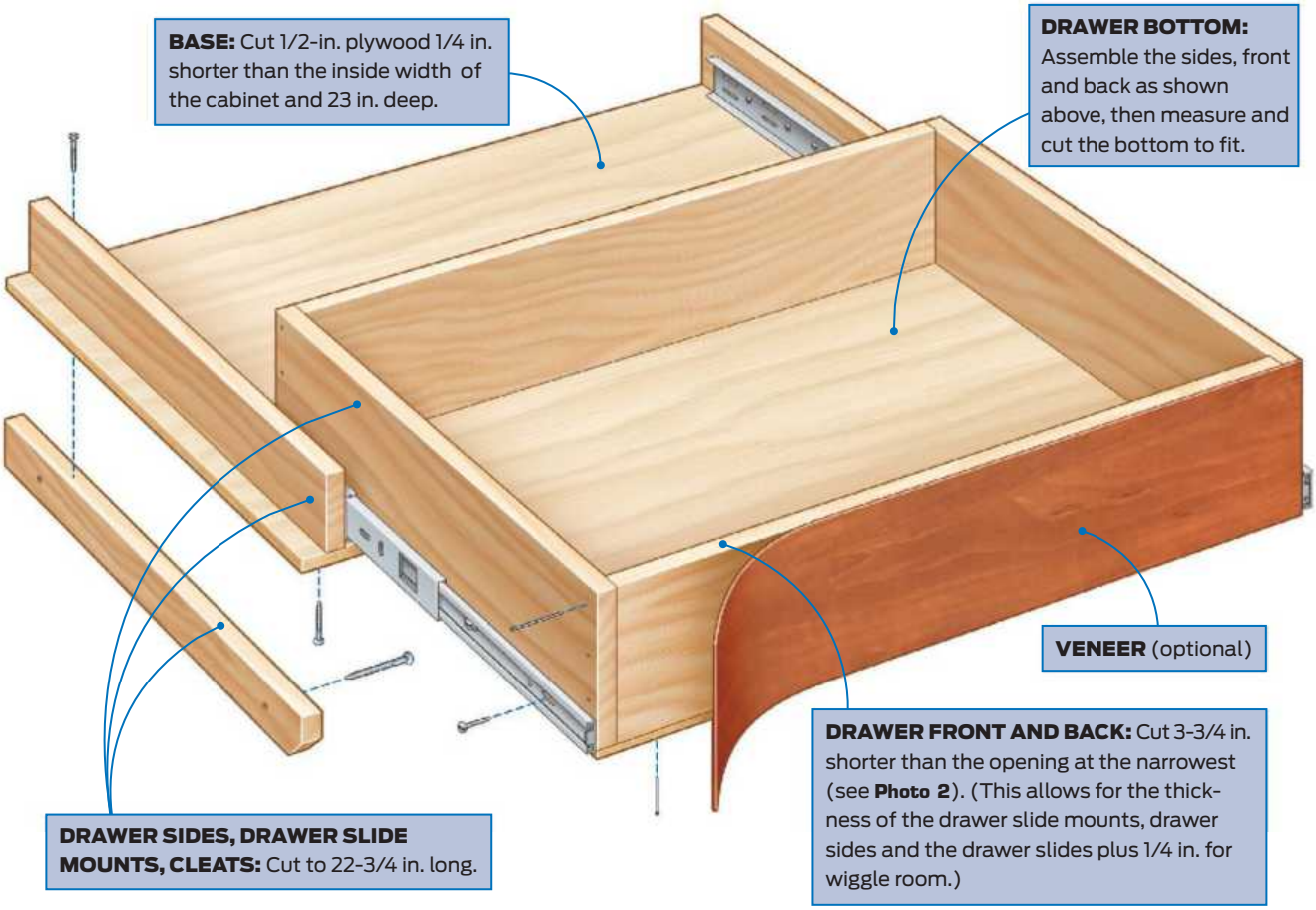
2 MEASURE THE OPENING
Open the door(s) on the cabinet and measure between the narrowest part of the opening (including projecting hinge hardware) to size the rollouts. After measuring, remove the doors to make it easier to work and to prevent damage.

3 TEST-FIT BEFORE ASSEMBLY
Cut the rollout base, drawer sides, front and back, and drawer slide mounts following Figure A on p. 12. Loosely assemble the parts in the cabinet to make sure everything is going to fit before moving on to assembly.

4 ASSEMBLE THE PARTS
Glue and nail together the drawer with 2-in. brads. (Remember: The front and back go between the sides, not the other way around!)

Figure A Anatomy of a simple rollout

If you have standard base cabinets, there are a few standard measurements and benchmarks to follow when building your rollouts. Standard cabinets have an inside depth of just under 24 in. With that in mind, use these rules of thumb to cut your parts:



TRAVIS'S ROLLOUTS

"I love rollouts and have built several different versions for my shop and house. Here are just a few."

We keep our cookware right next to the stove: pans on the bottom, lids on the top.

Deep pantries make it notoriously difficult to access the stuff in the back. I filled our pantry with rollouts so we could get at everything.

This cabinet holds my biscuitry tools on the top, router accessories in the middle and routers on the bottom.

MORE ROLLOUT DESIGNS!
Go to familyhandyman.com and search for "rollouts."

These three rollout/drawer hybrids hold the finishes and solvents in my shop.

ART DIRECTION **VERN JOHNSON** • PHOTOGRAPHY **TOM FENENGA** • ILLUSTRATION **FRANK ROHRBACH III**

5 ADD THE BOTTOM
Use the bottom to square up the frame when you glue and pin it to the underside with 1-in. brads.

6 ADD THE DRAWER SLIDES
Clamp the drawer down to a flat surface, rest the drawer slide flush with the front of the drawer and predrill the holes into the non-slotted holes with a self-centering drill. Then anchor the slides to the drawer with the included screws.

7 MOUNT THE DRAWER SLIDES ON THE SLIDE MOUNTS
Clamp the drawer slide mounts to the bench. Place the drawer slides flush with the end and then screw them to the drawer slide mounts.

one will need 1/4-in. plywood for the bottom (**Photo 5**), 1/2-in. plywood for the rollout base (**Photos 8 and 9**) and of course, either 1x6s or 1x3s for the rollout frames. (We used clear pine for these, but you can use any wood as long as it's straight.)

Choose a 1x6 frame to corral bulky items like pans, linens or cereal boxes and a 1x3 frame for shorter items like canned goods, spices or utensils. (You can substitute 1x2s or 1x4s if you wish.) Both types get mounted on a 1/2-in. plywood base, which rests either on the cabinet bottom or on cleats that attach to the cabinet sides for elevated units. For each elevated rollout, you'll need 40 in. of 1x2s for support cleats (**Photo 10**). Each rollout will also require 4 ft. of 1x3, which is used for drawer slide mounts (**Photo 7**). Rollouts need to be anchored to prevent tipping. Just screw bottom rollout bases to the bottom of the cabinet. Anchor upper rollouts with angle brackets (**Photo 11**).

Assembly and finishing

After you cut all the parts, dry-fit everything inside the cabinet to make sure it will fit and allow enough clearance to operate (**Photo 3**). I can't tell you how many times I've forgotten to account for the width of drawer sides, the thickness of slides or something else and had to knock everything apart and start over. Plus, dry-fitting will force you to think through the assembly so you can avoid making a mistake.

After you cut the parts and assemble the rollout drawer, apply your choice of finish before you put the drawer slides on and install the unit in the cabinet. We covered the front of our rollouts with a self-adhesive veneer to help them blend in with the cabinets. You can find some veneer options at home centers and woodworking stores, and many more online by searching for "self sticking veneer."

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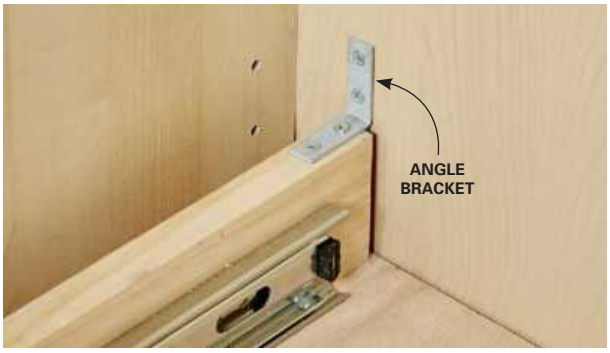
8 CLAMP THE DRAWER ASSEMBLY TO THE BASE
Engage the slides, then center the rollout drawer on the plywood base and clamp the drawer mounts in place at all four corners.

9 SCREW THE DRAWER MOUNTS TO THE BASE
Flip over the assembly and predrill and anchor the slide mounts through the base with 1-5/8-in. screws.

10 FASTEN THE CLEATS TO THE CABINET
Support elevated rollouts on cleats. Rest the cleats on squares of plywood cut to the right width while you screw the cleats to the cabinet sides with 1-1/4-in. screws.



11 SECURE THE ROLLOUTS
Anchor elevated rollouts with angle brackets screwed to the cabinet back and drawer slide mounts (top photo). Anchor bottom rollouts by sinking a couple of 1-1/4-in. screws through the rollout base into the cabinet bottom, as shown in the bottom photo.

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DOUBLE your bathroom STORAGE

Two easy projects add storage and display space to a small bathroom

Bathrooms never have enough storage or shelf space. Finding a home for all your blow dryers, curling irons, toilet paper, and cans, soaps and bottles can be a challenge. Once you've filled your vanity, how do you squeeze more storage into a small bath? And what about your knickknacks?

Here are two simple projects to help you get the space you need.

EDITOR **TRAVIS LARSON** • ART DIRECTION **HOPE FAY** • PHOTOGRAPHY **BILL ZUEHLKE**

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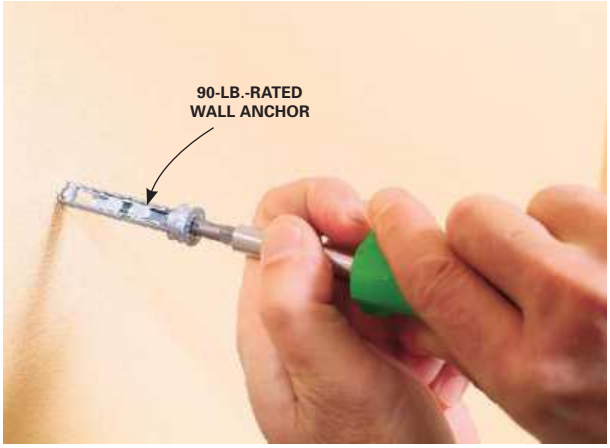
PROJECT 1:
INSTALL GLASS SHELVES

Most bathrooms have one area you can count on for additional storage, and that's over the toilet. Open glass shelving is a great way to display decorative bathroom bottles or knickknacks.

There are zillions of glass shelving systems on the market. Follow the directions that come with the system for the installation, but read on for help anchoring the shelves to the wall because you probably won't have studs exactly where you need them. We used masking tape to avoid marking the walls.

1 FIND LOCATION FOR BRACKETS
Apply a strip of 2-in.-wide masking tape above the center of the toilet and on both sides where the shelf brackets will be mounted. Draw a centerline with a level and mark the heights of the shelves on the center tape. Transfer the heights to the bracket tape with a 2-ft. level. Then measure from the centerline to mark the exact left and right locations for the brackets.

2 MARK WITH A SCREWDRIVER
Indent the drywall at the marks with a Phillips screwdriver and remove the tape.



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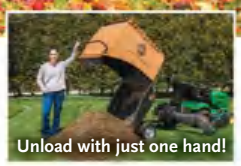
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PROJECT 2: INSTALL A LARGER MEDICINE CABINET

You can find a wide variety of medicine cabinets and shelves at home centers and kitchen and bath stores. When sizing a medicine cabinet, measure the space you have available behind your sink, both height and width. Keep a few inches away from existing light fixtures (unless you want to move them). Buy a cabinet that fits within those dimensions.

Surface-mounting a large medicine cabinet is just a matter of centering it, leveling it and screwing it to the wall studs. Your old cabinet may be surface-mounted or recessed into the wall cavity between the framing. Remove a recessed unit by opening the door, backing out the screws in the side of the cabinet and pulling it out of the recess. You may need to cut around it with a utility knife if it's caulked or painted in around the edges.

Have a helper support surface-mounted cabinets while you back out the screws, or if you're alone, screw a temporary 1x2 support ledger under the cabinet as we show in **Photo 1** to hold it while you unscrew it from the wall. You may need to move or replace the lighting beside or above the old cabinet. Now's the time to do it.

Hold the new medicine cabinet against the wall and adjust it up and down until the height is a good compromise for your family members, then mark the bottom and set the cabinet aside. Use the mark to draw a level line for positioning the 1x2 ledger (**Photo 1**). Then follow the photo series for installation details.

1 MARK THE STUDS
Mark the height of the bottom of the cabinet and draw a line with a 2-ft. level. Find the studs by probing with a nail and mark the stud positions above the level line. Screw a temporary 1x2 ledger board through the drywall into the studs. Mark the center of the sink on the ledger, and then measure over from the center mark to the left and right studs.

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2 TRANSFER STUD LOCATIONS
Mark the center of the cabinet at the top and bottom and transfer the center-to-stud locations to the inside of the cabinet. Start 2-1/2-in. screws at those marks.

3 FASTEN THE CABINET
Set the cabinet on the ledger and line up the center of the cabinet with the center mark on the ledger. Drive the screws into the studs, then remove the ledger. Fill the screw holes with spackling compound and touch up the paint.

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GET $100 FOR YOUR HANDY HINT! SEE P. 4 FOR DETAILS.

Leaf bag stiffener

The problem with paper leaf bags is that when they're empty, they collapse just as you start to put leaves in them. You can buy those fancy cardboard and plastic bag stiffeners, but why bother? I just roll the tops of the bags inward. This holds the top wide open while I dump in the leaves and other lawn debris.

Greg Reinhard

Measuring cup hang-up

Free up drawer space by hanging measuring cups inside a kitchen cabinet. Position and mount a wood strip so that the cups will hang between the shelves and allow the door to close completely. Mount a second strip for your measuring spoons, then screw in cup hooks on both strips.

Veronica Schuler

Electric grout cleaning

I always save my worn-out electric toothbrush heads because they're great for cleaning the grout between my shower tiles. I just apply a little bit of detergent to the head of the brush. It works especially well on corners.

John Willett

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Bucket bungee

I use a lot of 5-gallon pails to store tools and other construction gear in my pickup. But I was frustrated because they were always sliding around and tipping, and I couldn't always reach them without climbing up into the bed. My solution: Secure them in the pickup bed with bungee cords. Now they stay put!

Tim Horky

Windproof trash bin

Sick of picking up trash strewn about my driveway after a big windstorm, I decided to take action. At the hardware store, I found a nylon strap, the kind with a buckle. I fastened it to my garage wall with a deck screw and fender washer, looped it around my trash bin's handle, cut it to length and cinched it up. No more trash-collecting job for me!

Steven Rorabacher

Nature's drop cloth

When I paint long pieces of trim or siding, I do it on the lawn. No drop cloth needed! Any paint drips disappear the next time I mow the grass.

Adam Tokheim

No-slide knee pads

Knee pads that slip down your shins every time you stand up are a huge nuisance. Avoid the slide by strapping on a pair of hockey or baseball catcher's shin guards instead. You get comfortable knee pads that stay put, and shin protection, too. You can try a secondhand sports store or get a new pair for about $30 online.

Bill Jones

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by Jason White
editors@thefamilyhandyman.com

ART DIRECTION MARCIA DOEPKE • PHOTOGRAPHY TOM FENENGA • ILLUSTRATIONS FRANK ROHRBACH III

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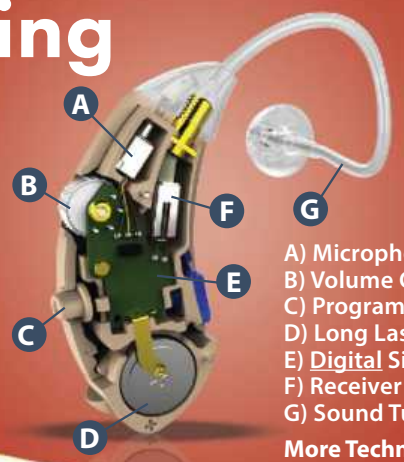

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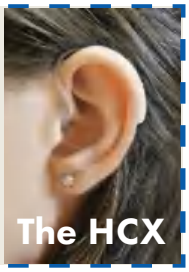

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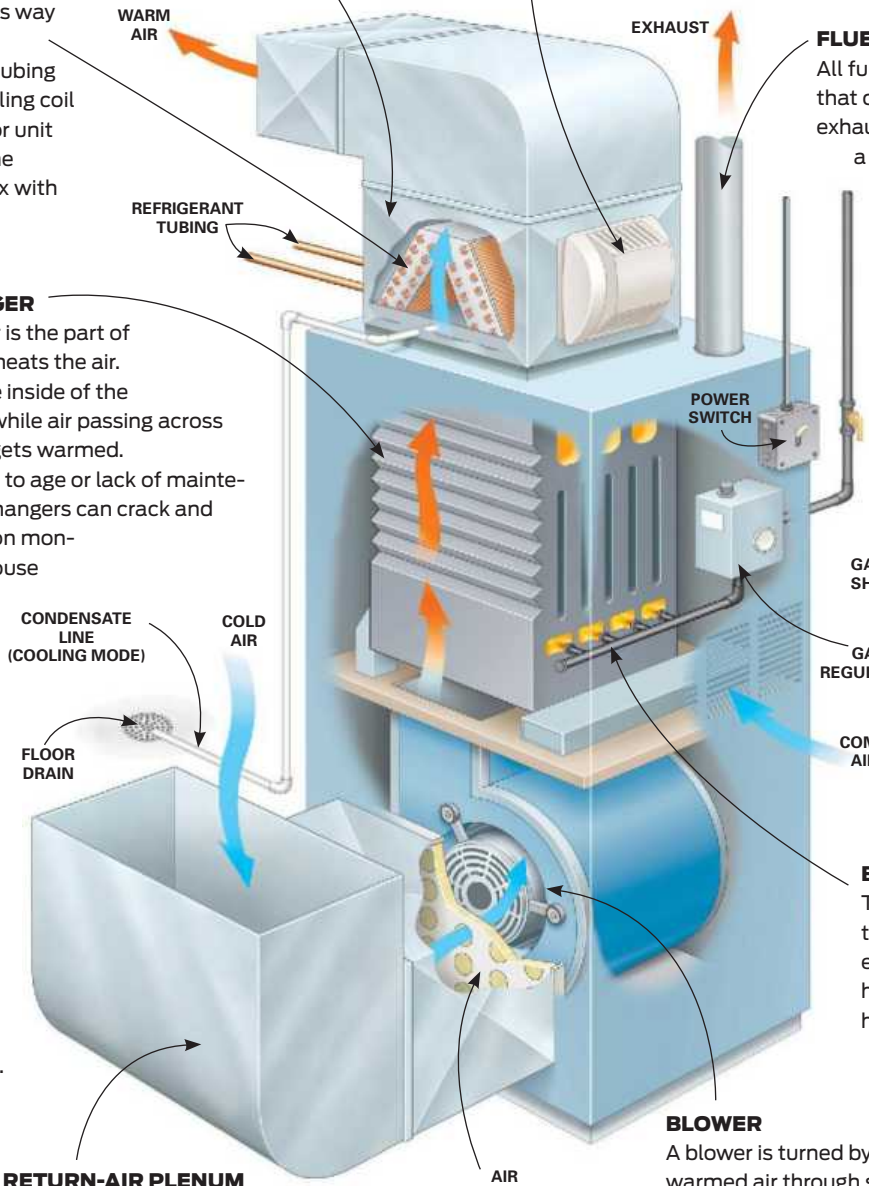
Anatomy of a conventional furnace

HUMIDIFIER
On some furnaces, a humidifier is mounted on the supply-air plenum to add moisture to dry air. When it stops working, it's usually because of a clogged or burned-out solenoid (electric water valve) or bad drum motor—all fairly easy to fix. For information on repairing an existing humidifier or installing a new one, visit familyhandyman.com and search for "humidifier."

SUPPLY-AIR PLENUM
The supply-air plenum is a large sheet metal box on top of the furnace. It distributes warmed (or cooled) air to the ducts.

COOLING COIL
If you have central air conditioning, a cooling coil cools air on its way up the supply-air plenum. Copper tubing connects the cooling coil to the compressor unit outside your home (that's the big box with the fan in it).



FLUE PIPE
All furnaces have a pipe that carries deadly exhaust outside by way of a chimney or through an exterior wall. Flues routed through walls can get blocked by shrubs, snow or small animals, causing the furnace to shut down.

HEAT EXCHANGER
A heat exchanger is the part of the furnace that heats the air. Flames warm the inside of the heat exchanger, while air passing across the outside of it gets warmed. Sometimes—due to age or lack of maintenance—heat exchangers can crack and leak deadly carbon monoxide into your house and kill you (see "Get a Carbon Monoxide Detector" on p. 33). Sometimes heat exchangers can be replaced. However, depending on how old your furnace is, replacing the entire furnace might be smarter.

BURNER
The burner warms the inside of a heat exchanger, which heats the air for the house.

BLOWER
A blower is turned by a motor and forces warmed air through supply ducts. Motor bearings are usually sealed and don't require lubrication, but even sealed bearings can fail over time and cause the motor to overheat.

RETURN-AIR PLENUM
Return ducts and the large return-air plenum carry air from rooms back to the furnace to be heated or cooled.

How it heats

A conventional "forced-air" furnace is a pretty simple system. A thermostat calls for heat, which triggers the furnace to burn fuel, which warms a heat exchanger. A motor spins a blower wheel, which moves cool air past the heat exchanger and pushes the newly warmed air through supply ducts and into the rooms of your house. Meanwhile, cooler air in each of the rooms gets pulled back toward the furnace through cold-air return ducts. You'll usually see return grilles mounted in the floor or low on a wall.

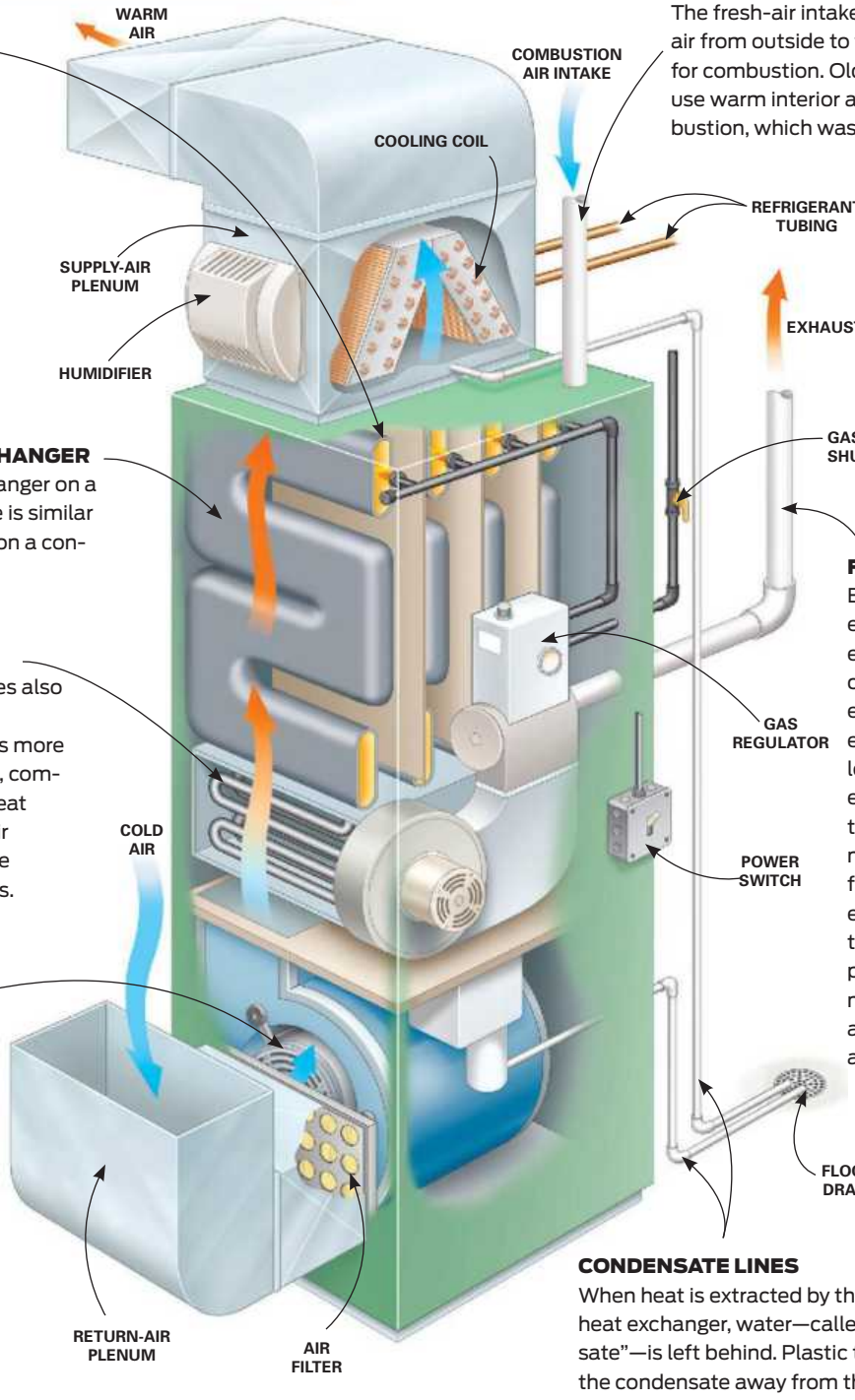
Anatomy of a "high-efficiency" furnace

"TWO-STAGE" BURNER
Some high-efficiency furnaces have a two-stage burner. When it's cold in the house, the burner runs on high to warm up the house quickly. Once the house is warm enough, the burner switches to its low stage and consumes less fuel.

PRIMARY HEAT EXCHANGER
The primary heat exchanger on a high-efficiency furnace is similar to the heat exchanger on a conventional furnace.

SECONDARY HEAT EXCHANGER
High-efficiency furnaces also have a secondary heat exchanger that extracts more heat from exhaust and, combined with a primary heat exchanger, heats the air being pulled toward the furnace via return ducts.

VARIABLE-SPEED BLOWER
Some high-efficiency furnaces also have a variable-speed motor that spins the blower wheel faster or slower depending on how much heat is needed, thereby using less electricity.



FRESH-AIR INTAKE
The fresh-air intake pipe directs air from outside to the furnace for combustion. Older furnaces use warm interior air for combustion, which wastes energy.

FLUE PIPE
Because heat is extracted from exhaust by a secondary heat exchanger, the exhaust is no longer warm enough to rise through a chimney. Instead, a fan pushes exhaust gases through a flue pipe—usually made of PVC—and out through an exterior wall.

CONDENSATE LINES
When heat is extracted by the secondary heat exchanger, water—called "condensate"—is left behind. Plastic tubing carries the condensate away from the furnace to a floor drain or condensate pump. The cooling coil also has its own condensate line.

How it heats

Like conventional furnaces, high-efficiency models use a heat exchanger to warm the air. In fact, they have two heat exchangers—a primary one and a secondary one.

The secondary heat exchanger extracts heat from exhaust—heat that would otherwise go out the flue—and uses it, combined with heat from the primary heat exchanger, to warm the air in your home. Because heat is removed from the exhaust, it's not warm enough to rise, so it can't be vented up through a chimney. A small PVC exhaust pipe run through an exterior wall is all that's needed. These units also require a second PVC pipe—usually located close to the exhaust pipe—to deliver fresh outside air to the furnace for combustion.

Before you call for repairs ...

7 THINGS YOU MUST CHECK

1 AIR FILTER

A badly clogged air filter can cause the furnace to overheat and shut off, so replace it if it's dirty. It can be hard to tell with some filters, so consider installing an air filter gauge that lets you know when it's time to replace the filter (see p. 37).

2 POWER

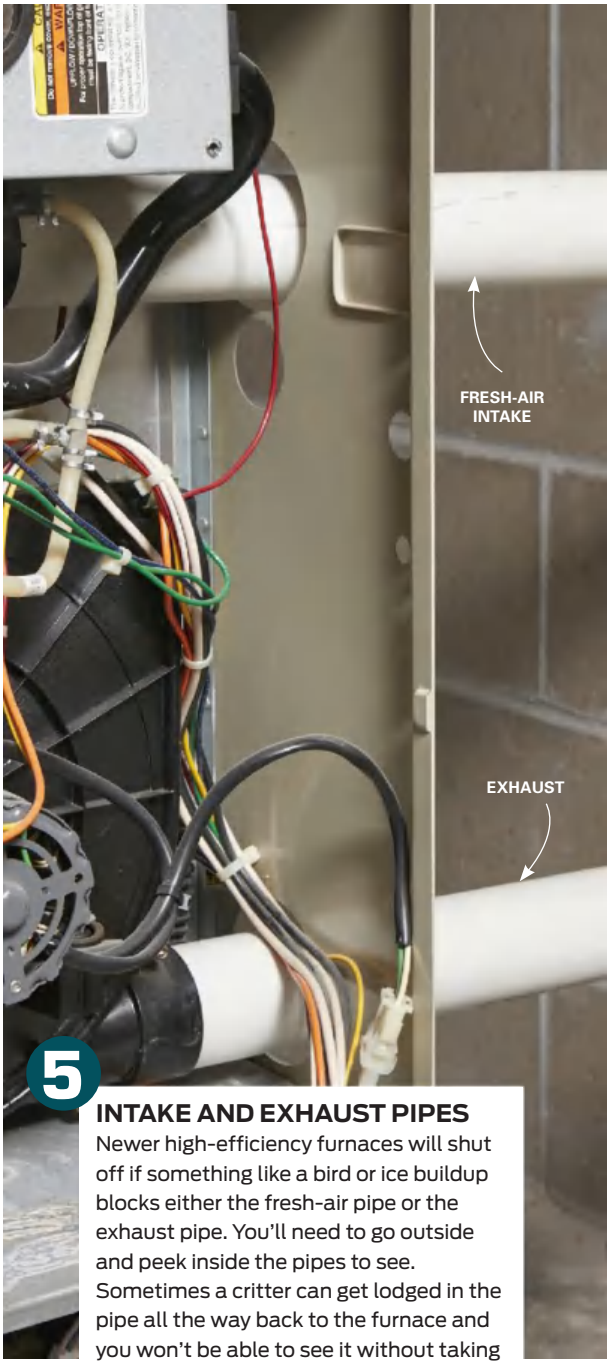
Make sure the power is on! The power switch for your furnace looks like a regular light switch and can get bumped and turned off accidentally. If the switch is off, just flip it back on.

3 THERMOSTAT

Be sure your thermostat is set to "heat" and at a temperature higher than the temperature inside the house.

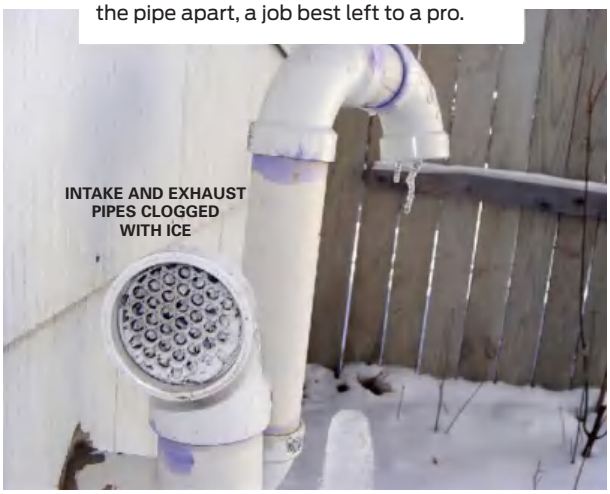
4 GAS LINE SHUTOFF

Check the ball valve on the pipe that supplies gas to your furnace and make sure it's open all the way. When the valve's handle is parallel to the pipe, it's open.



5 INTAKE AND EXHAUST PIPES

Newer high-efficiency furnaces will shut off if something like a bird or ice buildup blocks either the fresh-air pipe or the exhaust pipe. You'll need to go outside and peek inside the pipes to see. Sometimes a critter can get lodged in the pipe all the way back to the furnace and you won't be able to see it without taking the pipe apart, a job best left to a pro.



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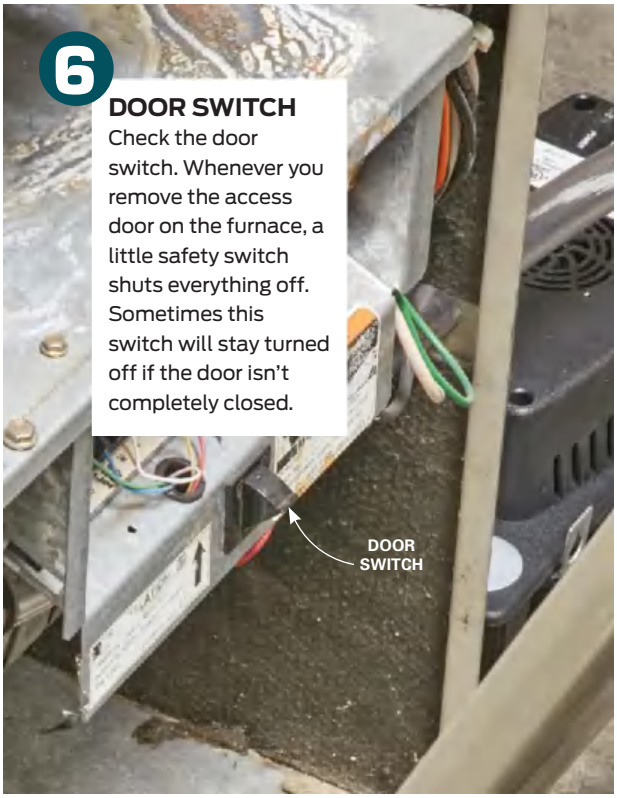
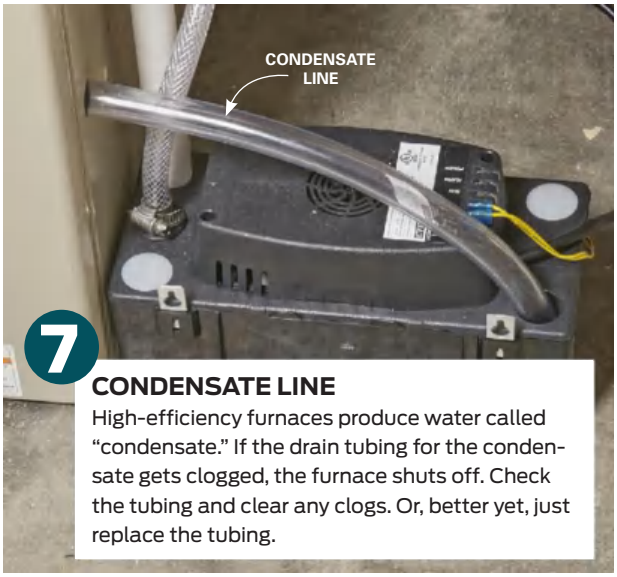


6 DOOR SWITCH

Check the door switch. Whenever you remove the access door on the furnace, a little safety switch shuts everything off. Sometimes this switch will stay turned off if the door isn't completely closed.



7 CONDENSATE LINE

High-efficiency furnaces produce water called "condensate." If the drain tubing for the condensate gets clogged, the furnace shuts off. Check the tubing and clear any clogs. Or, better yet, just replace the tubing.

Get a carbon monoxide detector

When heat exchangers crack or there's a leak in the exhaust pipe, deadly carbon monoxide can seep into your home's living space. That's why it's critical that you have a working carbon monoxide detector. You can buy two-in-one carbon monoxide and smoke detectors, or stand-alone units that you just plug into a wall (with backup batteries) for $20 to $40 at home centers.

Continued on p. 37

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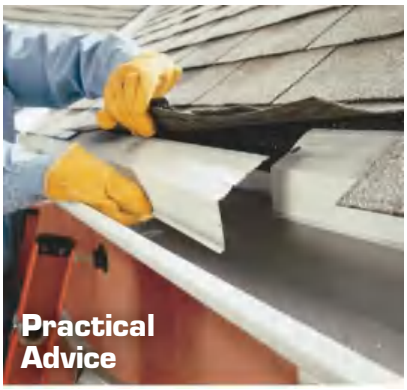

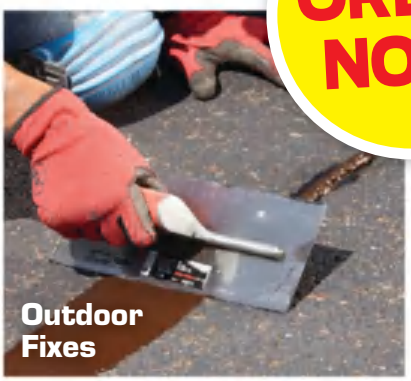

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GOT A COLD ROOM?

1 CHECK THE COLD-AIR RETURNS
If you have some rooms that are warmer or colder than others, the problem might be a blocked air return. They're usually located in the floor or low on an interior wall (see photo). When blocked, cold room air can't "return" to the furnace to be reheated.

2 ADJUST THE DAMPERS
Check dampers to make sure they're not restricting airflow to the rooms that need it. Some need to be adjusted differently for winter and summer. You'll usually find them near the supply-air plenum on the large ducts that feed the rooms in your house.

MEET THE EXPERT

Mark Johnson is president of Superior Heating, Air Conditioning & Electrical Inc. in Anoka, MN. He's been installing HVAC systems for 36 years and contributed to this article.

The best furnace advice: Change the filter

Clogged air filters are usually to blame when a furnace stops working. Dirty air filters are also hard on blower motors and heat exchangers, so it's a good idea to replace your air filter before there's a problem. It can be hard to remember to check it regularly. That's where an air filter gauge can help; it eliminates guesswork by measuring airflow and telling you exactly when it's time to change your air filter.

What "efficiency" means

An AFUE (annual fuel utilization efficiency) rating on a furnace tells you how efficiently the furnace turns fossil fuel into usable heat. An older-style furnace will have an efficiency rating of 56 to 83 percent, while a modern "high-efficiency" furnace will have a rating of 90 percent or higher. That means 90 percent of the furnace's fuel becomes usable heat for your home, while the other 10 percent is lost with the exhaust up the chimney.

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10 Things to Do Before Winter

If you live in a cold climate, there's more to preparing for Old Man Winter than closing your windows and cranking up the thermostat. If you want to protect your possessions, you might have to bring them in, empty them out, clean them up or shut them down. This all may sound daunting, but most winterizing tasks don't cost a lot of money or take a lot of time. Here are 10 tips to help you avoid costly repairs come springtime.

by Mark Petersen
editors@thefamilyhandyman.com

GETTY IMAGES/BOOMER JERRITT

1 WINTERIZE YOUR PRESSURE WASHER…
Or ice might destroy it

I once owned an electric pressure washer. I refer to it in the past tense because a few years ago, I left it in the garage over the winter without draining the pump. The water froze and expanded, and when I fired up the washer the following spring, water sprayed from every part of the machine except the end of the wand.

I should have disconnected the hoses and sprayed in a pump antifreeze/lubricant like Pump Saver from Briggs & Stratton. That forces the water out and replaces it with antifreeze and lube. Pump antifreeze/lubrication is available at home centers for about $10.

Mark Petersen, Associate Editor

REUBEN SALTZMAN

2 DISCONNECT GARDEN HOSES…
Or risk major water damage

A garden hose that's left connected to a spigot will trap water inside the spigot. When that water freezes, it can bust open the spigot, the hose or both. Sometimes the pipe behind the spigot bursts and sprays hundreds of gallons *inside* the house. This can happen even with a frost-proof spigot and even if the water supply is off. So always disconnect garden hoses before winter arrives.

3 DRAIN GARDEN HOSES…
Or waste money on replacements

Due to circumstances (laziness), I sometimes neglect to drain garden hoses before putting them away for the winter. Usually it's not a problem. But every once in a while, freezing water splits a hose open. I've lost a few cheap hoses this way and a super-expensive one (ouch!). That's just dumb because draining hoses is so quick and easy: Blast out the water with an air compressor or stretch them out on a sloped yard or driveway.

Gary Wentz, Editor-in-Chief

4 DRAIN MECHANICAL SPRINKLERS…
Or buy a new one in the spring

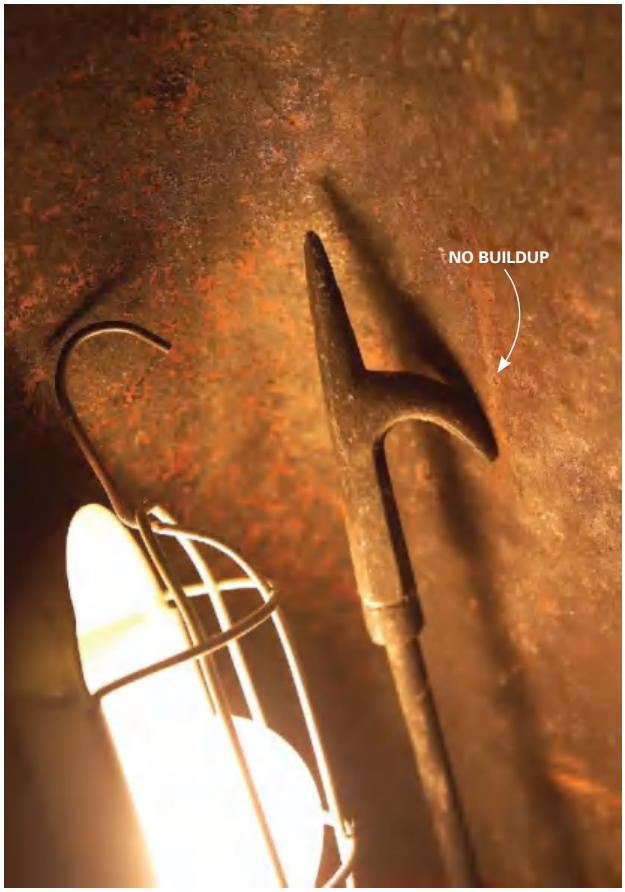
I bought one of those sprinklers that looks like a little tractor. It's designed to follow the path of the hose on the ground. It was expensive (more than $70), but it worked perfectly for my irregular-shaped yard; that is, until it spent the winter in my unheated garage. The residual water froze and destroyed the gears inside. The following spring, all it did was dribble water and make a clicking sound. I should have drained it before storing it. Just to be safe, I'll keep the new one on a shelf in the basement.

Ken Collier, Editor-at-Large

5 CLEAN ATTIC VENTING... *Or invite ice dams*

Poor attic ventilation can cause ice dams in the winter months, increase cooling costs, create a home for mold and reduce the life of shingles during the dog days of summer.

Over time, the vents located in your soffits and on some gable-end wall vents get clogged with dust and debris and lose their effectiveness. Clean them with a leaf blower or compressed air. You could use a pressure washer, but stick to a couple quick passes because you don't want to saturate the attic insulation with water. Clean the vents every few years, unless you live near a lot of trees with floating seeds, which can clog vents in one season.



6 CHECK YOUR CHIMNEY... *Or risk a fire*

Creosote buildup causes chimney fires. You should have your chimney professionally inspected or cleaned after every 70 fires. If you burn wet wood (which you shouldn't), have it inspected or cleaned every 50 fires.

Don't remember the last time you had it cleaned by a pro? A quick way to tell if your chimney needs cleaning is to run the point of your fireplace poker along the inside of your chimney liner. If you find a 1/8-in. layer (or more) of buildup, call a chimney sweep.

7 EMPTY FLOWERPOTS... *Or they could break*

One winter, in order to save garage space, I decided to leave a bunch of clay, ceramic and glass pots outside over the winter. I figured, "They were designed to be outside. What could it hurt?" However, that spring I found that several had cracked or broken because the moist soil inside them had expanded when it froze. I now empty the pots, or make sure the soil is dry and keep them covered, or take the pots in for the winter.

Beverly Petersen, Field Editor

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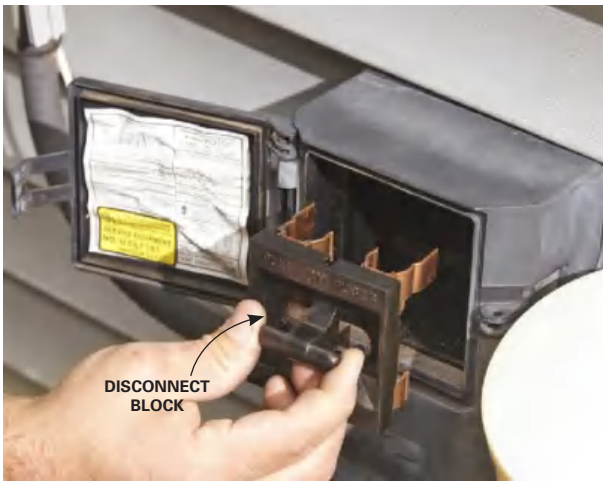
8 SWAP OUT THE GAS IN SMALL ENGINES...

Or replace the carb in the spring

Standard gas at the pump can gum up a carburetor on a small engine in just a few months. I've had to replace a few carburetors for this reason. Now, when I know that it's the last time I'm going to use a tool for the season, I suck out the gas from the tank with a turkey baster and run the engine dry. Then I add a bit of nonoxygenated gas, which has a longer shelf life but is too expensive to burn all year. I also add a splash of fuel stabilizer and run the engine for a while on the good stuff before storing it.

Josh Risberg, *TFH* Lead Carpenter



9 CUT THE POWER TO YOUR A/C...

Or waste energy and damage your compressor

Cut the power to your central air conditioner before the weather turns frigid. Your compressor could be damaged if your A/C accidentally gets turned on in low temperatures. Also, some A/C compressors have a crankcase heater to keep the oil warm. Running this heater in the winter is a waste of money, and the warmth could attract mice.

Flip off the breaker if the A/C compressor has a dedicated circuit, or rotate the disconnect block upside down into the "off" position. The disconnect block is located in the small panel outside near the compressor. Reenergize the unit 24 hours before startup. That will give the oil time to reach operating temperature.

ART DIRECTION **VERN JOHNSON** • PHOTOGRAPHY **TOM FENENGA UNLESS NOTED**

10 PROTECT THE A/C COMPRESSOR... *Or risk damage from a falling icicle*

There's no reason to wrap your entire air conditioner for the winter, and many manufacturers advise against it because it can invite rodents and cause condensation, which can lead to early corrosion. But it's not a bad idea to set a piece of plywood on top of the unit to protect it from falling icicles. See Tip 5 to learn one way of preventing the icicles in the first place.

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BY RICK MUSCOPLAT editors@thefamilyhandyman.com

How to Buy a Reliable Used Car

GETTY IMAGES/JGI/JAMIE GRILL

Cars and trucks have changed a lot over the last 10 years. These days, almost every mechanical system is controlled by electronics. In fact, a typical two- or three-year-old vehicle has more than 100 microprocessors, 50 electronic control units and 5 miles of wiring. If you think you can thoroughly check out a late-model vehicle by taking it for a short spin and kicking the tires, think again.

Finding a reliable used vehicle works best as a three-step process that involves online research, a thorough initial inspection, and a final physical and computerized inspection performed by a mechanic. We'll give you some tips on handling the first two steps yourself so you can weed out the clunkers before spending money for your mechanic to do a final check. But trust us: If you skip the final mechanic's inspection, it could cost you dearly. So if you have your heart set on a particular make and model, start with Step 1 before you go shopping.

STEP 1:

Check out vehicle reliability

Some makes, models, engines and transmissions are known for their high failure rates. Those are the facts you want to know before you start shopping. Some of the following sources charge a fee but may also be available for free at your local public library. Here's where to look for that information.

- **Consumer Reports** ($30 per year)—Vehicle system reliability info based on actual readers' experience.
- **Truedelta.com** ($10 for 90 days)—Here you'll find vehicle system reliability information along with actual repair costs incurred by owners.
- **Alldatadiy.com** ($27 per year) or **eautorepair.net** ($26 per year)—These up-to-date lists of technical service bulletins from carmakers disclose known failures, updated parts and repair procedures, and software fixes.

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PITTSBURGH AUTOMOTIVE

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LOT 69252/60569 shown
68053/62160
62496/62516

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- Weighs 34 lbs.

$59.99 SAVE $60

~~$89.99~~ comp at $119.99

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69222 shown

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Customer Rating

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SUPER COUPON

MOVER'S DOLLY

Customer Rating

HaulMaster

LOT 60497/93888 shown
61899/62399/63095/63096
63098/63097

SAVE 59%

- 1000 lb. capacity

$7.99

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69257 shown

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69111/62522/62573

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SUPER COUPON

CENTRALPNEUMATIC

3 GALLON, 100 PSI OILLESS PANCAKE AIR COMPRESSOR

LOT 95275 shown
60637/61615

Customer Rating

SAVE 49%

$49.99

comp at $98.62

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drillmaster

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LOT 61609
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Customer Rating

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63150/61524/62322/90984 shown

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SUPER COUPON

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SAVE $73

LOT 60338
69381 shown

Customer Rating

$89.99

comp at $163.06

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SUPER COUPON

HARDY

POWDER-FREE NITRILE GLOVES PACK OF 100

Customer Rating

Item 68498 shown

- 5 mil thickness

SAVE 62%

SIZE	LOT
MED	68496/61363
LG	68497/61360/97582
X-LG	68498/61359

YOUR CHOICE

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SAVE $100

BADLAND

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LOT 61258 shown
61840/61297
68146

51719696

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STEP 2:

Do your own inspection

Once you've selected a particular make and model and you go check out actual cars, here is a series of simple, quick things you can check out to eliminate possible problem cars.

Check all the features

Test every vehicle feature to check for proper operation: power windows, power locks, power sliding door and hatch, sunroof, power seat, heated seats, power mirrors, cruise control, all climate control settings, backup camera and sensors, keyless entry and remote start, and exterior/interior lights.

ASSEMBLE A CAR INSPECTION TOOLBOX

Before you check out a vehicle, go to the auto parts store and buy a tread depth gauge, brake test strips and a digital volt ohm meter. You'll also need a kitchen thermometer and a flashlight. Then go through all the following inspection steps on your own car so you know what you're doing when you conduct a real inspection on a prospective purchase.

Do a bulb check

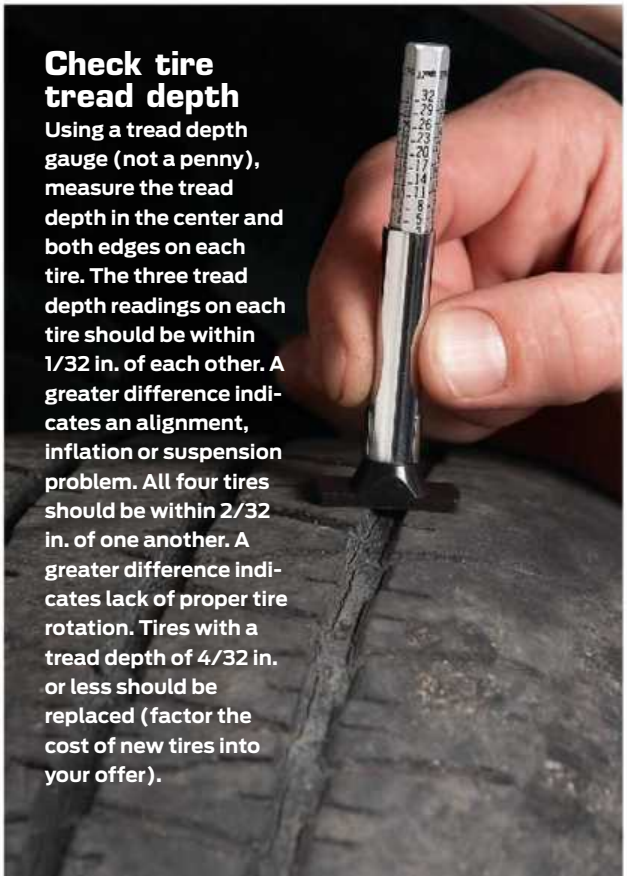
Turn the key to the On position but don't start the vehicle. All the warning lights (icons) should illuminate to prove that the bulbs work. Consult the owner's manual to see which warning lights are installed on that vehicle. The most common is the "Check Engine" or "Service Engine Soon" light. But also check for ABS, Brake, SRS (airbag), TPMS (tire pressure), OIL, HOT (or gauge), ESP/TCS (traction/stability), and Battery/Charging lights. Then start the engine. All warning lights should turn off. If not, there's a problem.

Check the dipstick

Pull the engine oil dipstick and examine the color. A honey color is an indication of fresh oil—light brown indicates slightly used oil (both good signs). However, a chocolate milk color is a bad sign that may indicate a leaking head gasket—easily a $1,500-plus repair.

Check tire tread depth

Using a tread depth gauge (not a penny), measure the tread depth in the center and both edges on each tire. The three tread depth readings on each tire should be within 1/32 in. of each other. A greater difference indicates an alignment, inflation or suspension problem. All four tires should be within 2/32 in. of one another. A greater difference indicates lack of proper tire rotation. Tires with a tread depth of 4/32 in. or less should be replaced (factor the cost of new tires into your offer).



ART DIRECTION **VERN JOHNSON** • PHOTOGRAPHY **TOM FENENGA UNLESS NOTED**

Check engine coolant for electrolysis

On a cool engine, remove the radiator or overflow tank cap. Using a digital volt ohm meter, set the dial to the 2-volt DC scale. Then touch the negative meter lead to the negative battery post. Dip the positive lead directly into the coolant in the radiator or overflow tank. The reading should be less than 0.300 volts. If it's not, the coolant is worn out and there's a good chance corrosion has already started to eat away at cooling system components.

If the reading is below 0.300 volts, turn off all electrical accessories, start the engine and rev it to 2,000 rpm and repeat the test. If the reading rises, the vehicle has an electrical grounding problem that must be addressed. Wipe off the meter probes before storing.

Check brake fluid condition

When brake fluid wears out, internal corrosion sets in and corrodes brake parts from the inside out. The corrosion process leaches copper into the brake fluid. You can test for the presence of copper by dipping a test strip (such as BrakeStrip, $7 for two strips from summitracing.com) into the brake fluid reservoir and comparing the color with the chart on the package. A high reading is an indication of owner neglect along with a high possibility of internal brake system corrosion damage.

Check for rust and paint blisters

Check along the edges of the hood and trunk lid, rocker panels, bottom edges of doors and around wheel wells. Look for any rough or raised areas that might indicate the start of serious rust issues. Sellers often mask rust problems with touch-up paint, so look carefully.

Test A/C performance

Close the windows and doors and set the A/C to "Max" and "Recirculate." Insert a kitchen thermometer into the center air duct. Start the engine and rev to 1,500 rpm for several minutes. The temperature should slowly drop into the 40s (unless it's a very hot day with high humidity). If the temperature doesn't fall below the high 50s, the A/C system requires service.

Check for leaking CV boots
Turn the wheels full left or right. Shine your flashlight at the CV boots on each end of the axle. If you see tears or grease, you're looking at a $400 repair.

STEP 3:

Get a professional inspection

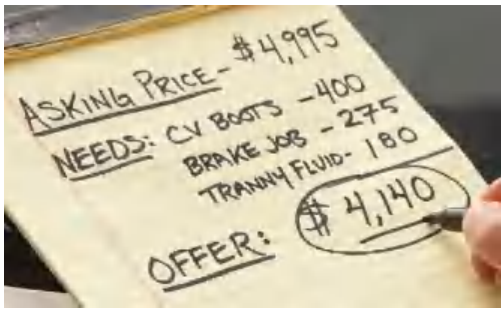
Expect a professional mechanic's inspection to run you $125 to $200. A professional inspection can discover the early stages of problems way before they turn into costly failures. So it's worth it to pay for a full physical inspection and test drive along with a complete computer scan.

The computer scan can discover whether the seller recently cleared trouble codes to cover up a problem. A professional scan tool can also check whether the vehicle's software is up-to-date. Software updates are critical to the proper performance of your vehicle, and unlike free software updates for your home and business computers, updating vehicle software costs about $200.

Test-drive the vehicle

The vehicle should start right up and idle smoothly. Acceleration and all shifts should be smooth; jerky acceleration or harsh shifts are trouble signs. Apply the brakes at highway speed and check for brake pedal pulsation, steering wheel shake, or pulling to one side.

Also, drive the vehicle to a secluded area with flat pavement and drive for a short distance with your hands off the wheel. The vehicle should not pull or wander. If it does, that could be a sign of tire, suspension or steering issues.



Negotiate a price contingent on a mechanic's approval

Consult nada.com, kbb.com, edmunds.com and truecar.com to find what buyers in your area are paying for the same vehicle. Then subtract the cost of any required repairs discovered during your inspection. You can't blame a private seller for asking full retail car-lot price for a used car. But a fair market value for a used car from a private seller is halfway between trade-in and retail. So that's where you should start your negotiations—at that halfway point. Then subtract the cost of discovered repairs. Once you and the seller settle on a price, make the deal contingent on receiving a clean bill of health (no more than $300 in additional repairs) from your mechanic.

Beware of seller's claims

The most common buyer mistake is to trust the seller's claim that "the car just needs this small fix." The truth is, if the problem were really that small, the seller would have fixed it already. What the seller most likely means is: "I was hoping the transmission only needed a fluid change. Then the shop told me it was going to cost $2,000. So I'm actually telling you what my first guess was and hoping you'll believe it." So when a seller says, "It just needs this small fix," RUN!

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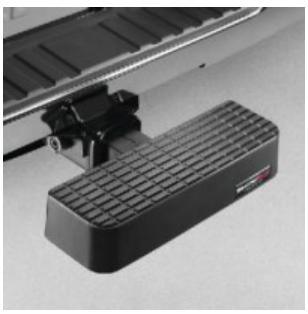

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BY MARK PETERSEN editors@thefamilyhandyman.com

Prep for Crack-Free Concrete

A concrete driveway is expensive, but it will last for decades if it's properly installed. Good finishing techniques will make a slab look great for a while, but proper ground prep will *keep* it looking that way over its lifetime.

We spent a day on the job with a longtime concrete pro (they don't like to be called cementheads). He gave us some great tips on how to prepare a site for a pour. He couldn't stress enough that the most important steps for cement slab installation are done *before* the cement truck arrives.

MEET THE EXPERT

Glenn Anderson is the owner/operator of Above Quality in Prior Lake, MN. He's been finishing slabs, laying block and stacking stone for 25 years.

A good base is everything!

Concrete will crack and crumble if it's not poured over a solid, stable base. Bringing in 4 to 6 in. of a good compactable base is a good rule of thumb, but the exact amount of base for your driveway depends on the condition of the existing soil, the climate, and what you plan to park on your driveway.

You may be able to pour directly over sandy or gravelly soil without bringing in any additional base. But if you live in a cold climate, are pouring over heavy clay or organic soil, or plan to park heavy vehicles on the driveway, you may want to increase the base layer to 10 or 12 in.

The best way to find out how much base you need is to contact the nearest concrete supplier. If you explain your soil conditions and the slab's intended use, the supplier should be able to recommend the proper base depth and the type to use and provide contact info for a nearby base supplier. Your municipality may also have a handout of recommended base depths in your area.

Compact each layer of base

Make three or four passes with a plate compactor every time you add 2 in. of base, or "lift" (each layer you add is called a lift). Use a vibrating plate compactor like this one instead of the type that jumps up and down, sometimes referred to as a "rammer" or "jumping jack." Those are designed for compacting soil when backfilling trenches, not for compacting base.

Dampen the base

Super-dry base doesn't compact well. So if you're preparing the base layer in dry conditions, add a little moisture by spraying down each "lift" with a garden hose to achieve maximum compaction. Check to see if your base material has enough moisture by grabbing a handful and compressing it into a ball. If it holds its shape, you're good to go. Add water if it completely crumbles. Oversaturated base won't compact either, so don't spray so much water that it starts pooling. Adding water to every lift also helps keep the dust down.

Keep forms straight

Stretch a string between two screws installed at the edge of both ends of the form boards. The string will act as a guide to keep the form boards straight. Set the forms at the proper height before bringing in the last lift. That way you can use the forms themselves as a guide for the final base height.

ART DIRECTION **VERN JOHNSON** • PHOTOGRAPHY **TOM FENENGA**

Secure the forms

Place a stake at least every 3 ft. Use your foot to align the form board to the string as you drive each stake. Try to drive the stakes in straight and flush with the board so the form doesn't get pulled out of alignment when you fasten it. Scab a board onto the splice if more than one board is needed on a side. Backfilling dirt against the forms before you pour will also help keep them in place.

Screw the stakes

Secure the stakes to the form boards with screws instead of nails (Torx-head screws work well). Pounding in nails can loosen stakes and knock everything out of alignment. Don't install the screws too low or they'll be tough to remove if the forms are backfilled. It's OK if screws protrude into the pour area if the edge of the concrete won't be visible; they'll easily spin right out, and the small hole won't be a problem.

Cut stakes flush

Cut the stakes off flush with the top of the form boards so they won't get in the way of screeding when it's time to pour. A recip saw can rattle a form out of alignment. If you do use one, wait until all the stakes are in, and don't use a super-aggressive blade. Make sure to knock down the grade near the forms so it won't interfere with the screed board.

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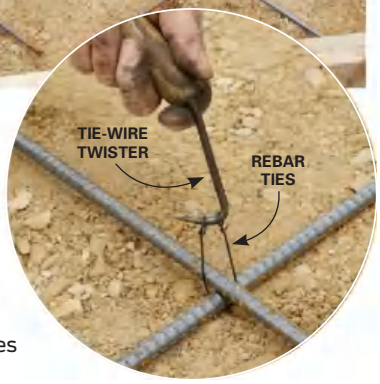

Reinforce with rebar

Our expert prefers to install 1/2-in. rebar in a 2-ft. grid pattern when pouring driveways. He ties the rebar together with precut rebar ties fastened with a tie-wire twister. Use enough ties so the grid will stay together if it's accidentally stepped on while suspended in the air.

Cut rebar with a grinder

A grinder fitted with an abrasive metal-cutting blade is a good setup to cut rebar. A lot of contractors swear by the $15 diamond masonry blades even though they're not specifically approved for metal.

Overlap rebar at least 20 in.

If an engineer has designed specs for the driveway, the length of the overlaps should be clearly indicated. If there are no specs, our expert overlaps by an amount equal to 40 times the width of the rebar. So in this case, 1/2-in. rebar x 40 equals a 20-in. overlap. Overlap more if you live in an earthquake zone. You can't overlap too much, so you can overlap several feet if you have no need for leftover, small chunks, and it can reduce the number of cuts you have to make.

Avoid stacking perpendicular splices whenever possible. Creating a rebar sandwich several layers thick decreases the amount of concrete in those areas, making them weak and prone to cracking. Keep the rebar at least 2 in. from the edges.

Bend rebar around corners

Rebar can be easily bent with this simple rebar bender ($30 at concrete supply companies). If you have only a few bends to make, standing on the rebar and pulling it up into shape works for rebar 1/2 in. and smaller.

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Tie into the existing slabs

When you're joining two concrete slabs, connect the two with rebar to keep them at the same height. Drill the holes as deep as you can (the entire length of the bit) so the rebar fits snugly into the holes. Insert chunks of rebar and tie them into the grid.

If you're working in a cold climate, never tie a floating slab into a house or any structure that's resting on footings. The slab will likely be pushed up by the frost, but the house will not. This will almost certainly result in cracks where the two are connected.

Set rebar on chairs

Rebar that's lying on the ground does no good whatsoever. Placing the rebar grid on chairs will ensure it stays centered in the slab. Chairs come in different sizes, so the height can be customized to the thickness of your slab. Space the chairs so the rebar sits level. Raised rebar is the mother of all trip hazards, so move slowly and deliberately when walking through the grid.

You won't be able to use chairs if you need to roll a wheelbarrow over the rebar to distribute the concrete. If that's the case, lay the rebar on the ground and pull it up into the center of the concrete as you pour. Concrete placers/rakes have hooks on them designed to do just that. Chairs are the best way to guarantee that the rebar is centered, so use them when you can. They cost less than 50¢ each at home centers.

Slope the slab

Any concrete slab should have a minimum slope of 1/8 in. per foot to keep water from pooling. If the proper slope can't be met down to the curb, angle the slab to one side or the other so the water runs off in the same direction as the natural grade of the yard.

Coat form boards

Used motor oil works as a good release agent to prevent the concrete from sticking to the form boards. But don't coat boards used to form steps or other surfaces that will be visible after the pour because the oil could stain the surface and prevent sealer from sticking. You can buy release agents for those applications.

Get a permit

Call your city or county to see if you need a permit. Many municipalities have requirements regarding the overall size and the width of the driveway where it meets the road.

BY JEFF GORTON editors@thefamilyhandyman.com

Remove Trim Without Wrecking It

There's an art to removing trim, whether you need to take off a few pieces of baseboard to install a built-in bookcase or remove all the trim in a room for a remodeling project. You have to do it properly to avoid damaging the walls, and the trim if you plan to reuse it. In this story, we'll show you how to do the job and keep the collateral damage as low as possible.

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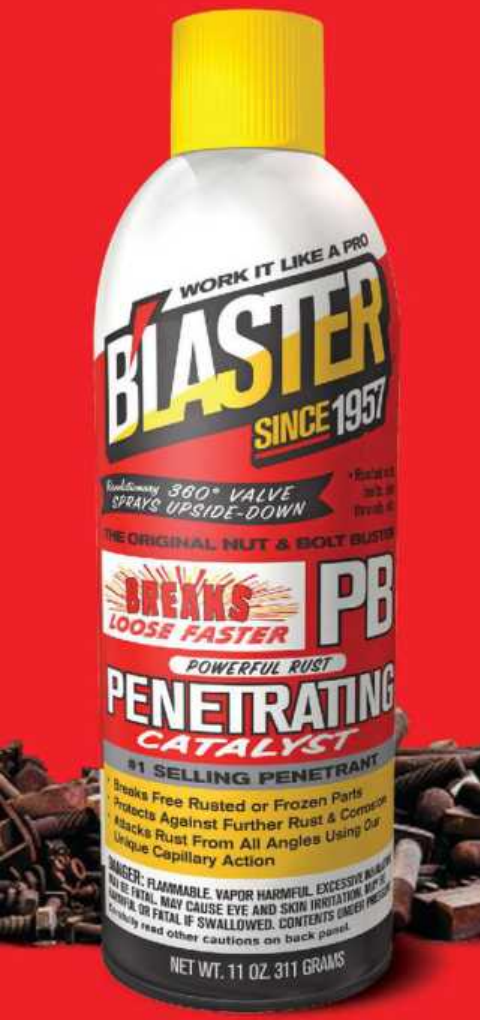

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Caution: Test for lead

Old trim may have layers of paint. Test for lead in the paint before you remove the trim, and if you discover it, follow lead-safe practices when you remove the trim. For instructions on testing and how to deal with lead paint safely, go to familyhandyman.com and search for "lead paint."

1 Slice the paint first

This tip applies mainly to painted trim. It's common for moldings to be stuck to the wall, or for adjacent pieces of trim to be stuck together, either from caulk or years of built-up paint. If you don't slice through the caulk or paint, the trim will be harder to remove, but more important, the wall or trim may get damaged.

Use a sharp blade in a utility knife to cut along the joint to separate the trim. Be prepared to change blades frequently because dried paint is hard to cut and tough on blades.

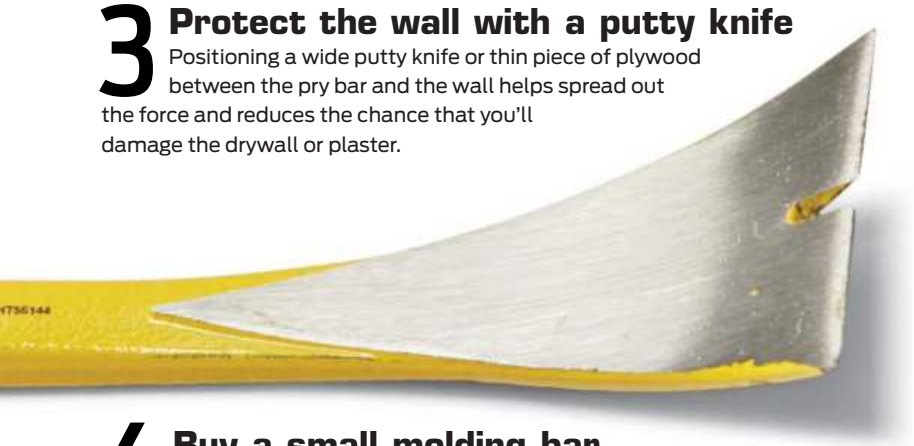
ART DIRECTION **VERN JOHNSON** • PHOTOGRAPHY **TOM FENENGA**

2 Start with a putty knife

Before you can start using a pry bar, you have to coax the trim loose to create a crack for the pry bar to fit into. The best tool for doing this is a stiff, sharp scraper blade. A painter's 5-in-1 tool also works well. Don't be afraid to tap the end of the tool with your hammer to drive it behind the molding. Then wiggle and push until you've created a crack big enough for the pry bar.

3 Protect the wall with a putty knife

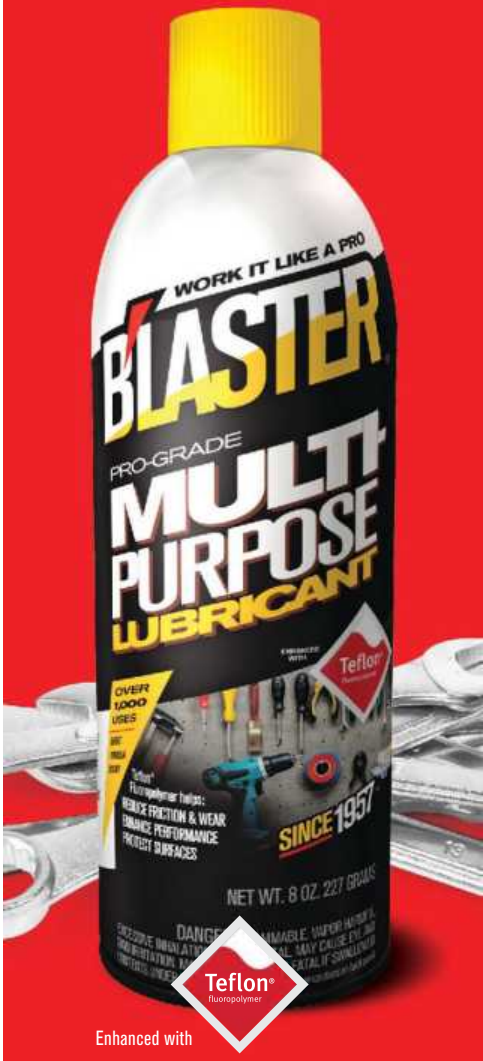
Positioning a wide putty knife or thin piece of plywood between the pry bar and the wall helps spread out the force and reduces the chance that you'll damage the drywall or plaster.



4 Buy a small molding bar

A small molding pry bar with a wide, sharp blade is good for removing smaller trim and for starting to pry off larger pieces of trim. These little pry bars have the advantage of fitting easily into your tool belt. Of course, you'll probably also need a medium-size pry bar for removing large trim or wide baseboard. The pry bar shown here is made by Stanley and is called a precision molding bar. You can buy a pry bar like this (about $10) at home centers and hardware stores.

The Most Versatile Tool in the Box.



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5 Start at the end

It's easier to remove trim if you start at one end. That way you can use leverage on the trim to your advantage, pulling out on the loose end to help loosen nails along the way. Be careful, though. It's also easy to overdo it and break trim by bending it out too far.

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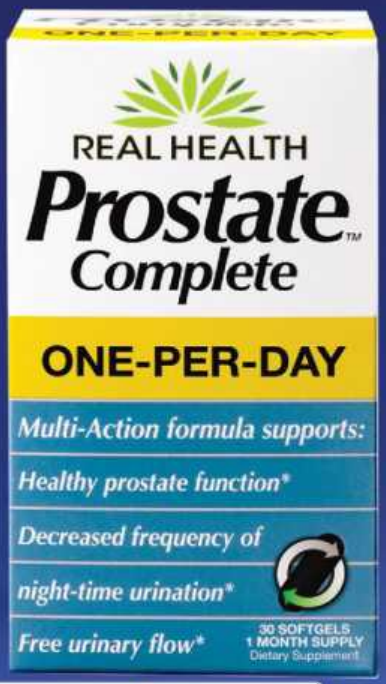

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6 Pry against studs when removing baseboard

If you pry against the wall where there's no stud, the pry bar might go right through the drywall. You can avoid this problem by prying only where studs are located. An easy way to find studs is to look for the nails along the top of the baseboard. These are usually driven into studs, so prying above them should be safe. If you can't spot any nails through the paint, reach for the stud finder.

7 Cut nails if the trim is hard to get off

Occasionally you'll run into a situation where the trim is trapped behind another piece of trim or some other woodwork, preventing you from prying it away from the wall, or is simply difficult to pry off. In these cases, slipping a hacksaw blade behind the trim and cutting the nails will free it. For this task, you can use a hacksaw blade in a holder, a reciprocating saw with a metal-cutting blade or an oscillating tool with a metal-cutting blade.

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8 Pull nails through the back with a nippers

Removing trim nails by pounding them out with a hammer usually causes splintering and damage to the face of the molding. To avoid this, pull the nails from the back of the molding. Grab the nail at the base with an end-cutting nippers and roll the nippers along the curved jaw to pull the nail. Don't squeeze the jaws any more than needed or you'll cut through the nail. If you don't have a pair of nippers handy, a locking pliers (Vise-Grip is one brand) will also work.

9 Be careful with miters

Miters are often pinned together at the point with a pair of finish nails driven in from both sides. If you simply pry off one side of the miter and pull it loose, you're likely to damage the moldings. Instead, gently pry off both mitered moldings as a unit. Then carefully work the joint apart little by little. If you're not having any luck separating the two moldings, cut the nails with a hacksaw blade or an oscillating tool.

10 Label the moldings

If you're planning to reinstall the moldings, make sure to label them. It's also helpful to bundle all the moldings for a particular window or door, and then label the bundle with the window or door location.

BY RICK MUSCOPLAT editors@thefamilyhandyman.com

Should you buy an air purifier?

KILL THE CONTAMINANTS The Sharp air purifier shown here (FP-F60UW; about $250) emits positive and negative ions that break down odors and kill germs, fungus, bacteria, viruses and mold. The unit also contains a pre-filter, an active carbon filter and a True HEPA filter. Sharp recommends replacing its filters every five years.

SHARP

If you suffer from allergies or want to reduce odors in your home, a room air purifier might be the solution. Room air purifiers can eliminate the tiniest dust, bacteria, mold, viruses, pollen and smoke in the surrounding area.

Shop for an air purifier based on the technology it uses to clean the air, its initial cost and the cost of replacement filters, the unit's noise level, the size of the room and the unit's clean air delivery rate (CADR).

CADR is a measure of how much clean air the unit can deliver in cubic feet per minute (cfm) for each type of contaminant. For example, a purifier sized to fit a 210-sq.-ft. room may have a CADR rate of 155/133/155 for dust/smoke/pollen, while a unit for a 340-sq.-ft. room may have a 231/220/245 rating. Bigger is better as long as you can live with the higher noise level of a larger unit.

Some models also remove odors. If that's a concern, shop for a unit that lists odor removal as a feature.

Room air purifiers vary widely in price, from as low as $39 to as much as $600. The cheaper units won't have much effect on your allergies; expect to pay $200 to $400 for one that does.

Three common room air purifier technologies

True HEPA air purifiers work by filtering out the airborne contaminants using a True HEPA filter that captures at least 99.97 percent of particles .3 microns in size. True HEPA filters are effective at removing pollen, dust, dander and some larger bacteria from the air. Sizing the unit to the room is critical because an undersize unit will clog quickly. Also, be wary of air purifiers that use filter terms like HEPA, HEPA type or ultra HEPA. Those filters may remove 99.97 percent of larger airborne particles like pollen, but if they don't filter down to .3 microns, they won't perform like a True HEPA unit. An effective True HEPA unit costs about $200. The downside to filtration-type air purifiers is the ongoing filter replacement cost, which can run about $250 per year.

Negative ion air purifiers work by giving airborne particles a negative charge so the particles migrate and

cling to positively charged walls, ceilings and floors. Negative ion units are controversial because they don't actually kill bacteria, viruses and mold, or filter them out of the room. They just get the particles out of the air and make them cling to room surfaces. You have to remove the particles with a True HEPA vacuum. In addition, some negative ion models generate ozone—a lung irritant. According to the EPA, ozone can also react with household cleaning products to create harmful by-products in your home.

Positive/negative ion air purifiers produce both positive and negative ions, which attach to germs, fungus, viruses, bacteria and mold and kill them by removing hydrogen from the particle's surface proteins. Some of these units also include a True HEPA filter and an activated carbon filter to remove odors. Ion-style air purifiers cost $200 to $600.

Whether you choose a filtration or an ion-style air purifier, follow these buying guidelines:

- Buy a unit sized to the room—bigger is better. A larger unit cleans faster and keeps the room cleaner.
- Get the lowest sound rating so the noise doesn't interfere with your daily life, especially if the purifier is in a bedroom.
- Check out the cost and availability of replacement filters.
- Skip the bells and whistles. Having more features usually doesn't result in a cleaner room.

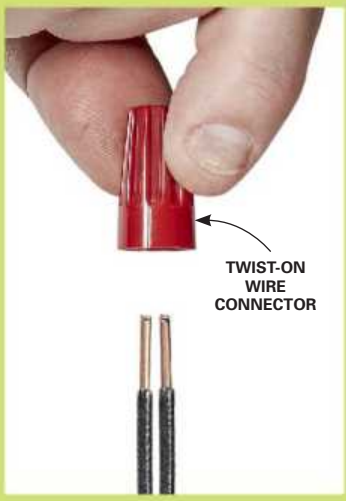
Before you buy

Think of an air purifier as your last line of defense against allergens and odors, not your first. Before you buy one, consider taking these steps to cleaner air:

- Install a MERV 11 furnace filter.
- Stop burning candles and reduce the number of wood fires, as well as ban smoking in your home.
- Clean dryer ducts at least twice a year and run bath and kitchen fans longer to exhaust more dust, humidity, odors and grease and reduce mold formation.
- Run your air conditioning with a MERV 11 air filter during pollen season and close all windows.
- Reduce the amount of carpeting in your home, and vacuum more often with a True HEPA filter vacuum cleaner.
- Remove shoes at the front door.

OOPS!

In our "Home Hacks" story in the June '16 issue (p. 57), we showed how to conceal a Wi-Fi router by building a box for it. Readers wrote in to warn of possible router overheating because of the lack of ventilation. They're right: The box we show is too small, and the router should never be placed on its edge. The bottom line: Keep your router out in the open.



Twist wires or not?

Every time we show how to connect wires by screwing a twist-on connector onto straight conductors, we get mail from electricians telling us we're doing it wrong. They insist that the only proper way is to twist the conductors and insulated portions before installing the connector.

We contacted product expert Cassie Donnelly at IDEAL Industries Inc., the leading manufacturer of twist-on wire connectors. Cassie explained that IDEAL's twist-on connectors contain square-wire springs that create threads, draw the conductors into the connector, and enable the twisting needed to make a secure mechanical connection.

Although twisting the wires before applying the connector is often standard practice in the industry, it's unnecessary and can double the amount of work. Cassie also pointed out that the key to making a secure connection with either the straight or the pretwisted methods is to twist the connector until the conductors show two to three twists outside of the shell. If you stop turning the connector as soon as it's snug, the connector could fall off. To prevent that, some electricians and DIYers tape the connector to the wires. Cassie said that if you use the right size connector and install it properly, it should never fall off. Taping a connector onto the wires adds an unneeded step.

ART DIRECTION **MARCIA ROEPKE** • PHOTOGRAPHY **TOM FENENGA** • CONSULTANT **BRYAN BARNES, AEROSEAL**

Seal leaky ducts for savings and comfort

Leaky air ducts can waste up to 30 percent in energy costs and make your home less comfortable. Worse yet, they can pull in dirt and contaminants from your attic and walls. If you're fighting dust or allergy issues with special furnace filters and air purifiers but don't seal your ducts, you're waging a losing battle. You can seal exposed duct joints with mastic, caulk or aluminum tape. (Search for "plug leaky ducts" at familyhandyman.com.) But you can't seal joints buried in walls and ceilings.

Ducts *can* be sealed from the inside using a process called aerosol duct sealing, but it's not a DIY project. We contacted Bryan Barnes from Aeroseal LLC to explain how it works and what you can expect in terms of improved energy efficiency and air quality.

AEROSEAL (3)

Why ducts leak

Rigid sheet metal and fiberglass supply duct joints in older homes were never sealed by the installers. When your blower kicks in and pressurizes the supply runs, up to 40 percent of that air winds up in your wall and joist cavities and attic spaces. Return ducts leak too, but differently. They pull in air from the wall and joist cavities.

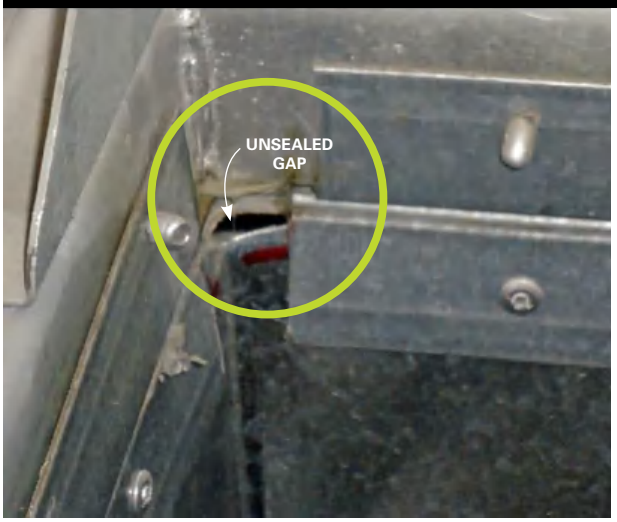
How leaks affect room comfort and air quality

HVAC systems are designed to deliver to and remove a certain amount of air from each room. If a room's supply ducts leak more air than the return duct, the room develops negative air pressure. To make up the deficit, the room sucks in extra air from the supply duct, as well as air from nearby rooms. That causes an air imbalance in other rooms. If the room door is closed, the negative pressure sucks in hot or cold outside air through the gaps around windows, light fixtures, ceiling fans and wall outlets. That air often contains high levels of dust, dirt and allergens, which decrease air quality.

Aerosol duct sealing works from the inside

The installers seal duct openings from the inside by injecting a heated atomized vinyl product under pressure. The material

Inside an HVAC duct



1 GAPS GET SEALED FROM THE INSIDE
The pressurized atomized sealant sticks to the edges of high-velocity gaps and holes in the ducts. As the hole closes, the increased air velocity causes the sealant to build until it totally seals the gap.

2 SEE THE IMPROVEMENT
Installers test the success of the aerosol sealant before they leave your house. In this case, the sealant reduced duct leakage from almost 900 cfm to 84 cfm—a 91 percent improvement.

On the House

With the Carey Brothers

Tips of the Month

FALL HOME MAINTENANCE FOR DUMMIES

Regular home maintenance is essential to reducing costs and preventing problems. A little cleaning here and patching there will keep your home safe, efficient and help preserve its appearance, integrity and value.

With different seasons come different tasks, thus, we share a few items on our autumn checklist that may need a bit of attention at this time of year.

- Don't wait until it rains to determine if your roof is leaking. Use a garden hose to water-test the roof and flashings for leaks. Start at the lowest point of the roof – near the eaves – and work your way up to the ridge, tackling a six-foot wide section at a time. Pay attention to valley flashings, plumbing and exhaust vent flashings and around chimneys. Have someone in the attic with a flashlight and cellphone looking for leaks. Use caution working on your roof and wear rubber soled shoes and a safety harness.
- Clogged gutters can back up and lead to roof leaks and expensive repairs. Check gutters and downspouts for debris, clean, caulk and touch up paint. Use a wire brush and/or a wire wheel on a cordless driver drill to remove rust. Apply a rust converter to stubborn rust and use gutter caulk to seal any leak points. Now would be an excellent time to install a gutter protection system to keep gutters clean. Be sure your ladder is on solid footing and take all necessary safety precautions.
- Repair crumbling or missing mortar joints around brick and masonry. This repair process is called "tuck-pointing." Use a cold chisel or grinder to remove flaking mortar and thoroughly clean the area with a brush and shop vac. Dampen the affected area with clean water and apply mortar patch in accordance with manufacturer directions using a tuck-pointing tool. Use a penetrating sealer to protect all masonry from water intrusion, which can cause freeze-thaw damage.
- Prepare for and prevent ice dams at eaves. One of the most effective means of preventing an ice dam is to keep the underside of your roof cool. Do this by making sure that the attic is well insulated and there are no gaps in the insulation, which cause heat from living space to escape into the attic. Also, ensure that there is ample high and low passive ventilation at the eaves and up high on the roof or at the ridge. Keeping the roof cool will prevent snow from thawing and refreezing, which can contribute to an ice dam. Chronic ice dams can also be prevented using eave-heating cable.
- Prevent drafts and energy loss by using a high quality exterior grade caulk around window and door trim. Caulking gaps prevents water from getting into areas that can cause rot. Caulk will also help prevent pests from making your home their home.

Get more home maintenance tips and information by picking up our book, *Home Maintenance For Dummies, 2nd Edition* (Wiley 2010) online and at bookstores everywhere.

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doesn't coat the interior of the duct. Instead, the vinyl particles attach to leak openings and build up layers until the leak is sealed shut.

The sealant can plug holes and gaps up to 5/8 in. across (see **Photo 1**) and remains rubbery to flex slightly as ducts expand and contract. Larger openings must be sealed using mechanical methods.

Most ducts don't require cleaning before sealing. However, extremely dirty ducts should be cleaned first. Sealed ducts can be cleaned in the future using traditional duct cleaning methods.

The application takes four to six hours. The product leaves a mild scent (similar to wood glue) that lasts for about a day. Aeroseal is guaranteed for 10 years, but testing has shown it to last the lifetime of the ductwork.

How much does it cost?

Aerosol duct sealing costs about $1,800 to $2,500 for an average home. You'll pay the higher cost if your HVAC equipment is in the attic or in a finished basement where access is limited. Based on the projected energy savings, figure a three- to five-year payback.

Who should do it?

If you live in a cold climate and have an older home with sheet metal or fiberglass ductwork, you'll probably save enough on your energy bill to make it worth your while. However, Bryan recommends duct sealing for any home that has comfort issues in rooms on the second floor or rooms far away from the HVAC equipment. In those cases, duct sealing can make the room more comfortable. To find a qualified installer, search online for "aerosol duct sealing."

MEET THE EXPERT

Bryan Barnes' company, Aeroseal, licenses the use of its duct sealing technology, first developed in the '90s at the Lawrence Berkeley National Laboratory.

Restore a fiberglass ladder

Over time, the sun's UV rays can deteriorate the surface layer of your fiberglass ladder, exposing the fibers to moisture, which can reduce its electrical insulating properties. In fact, exposed fibers can actually wick moisture in toward the metal frame, making it a hazard around electrical wires.

If your ladder shows exposed fibers, you can whip it back into shape by sanding and painting it. Buy a can of primer and spray acrylic lacquer or polyurethane with UV inhibitors rated for outdoor use. Pigmented paint lasts longer and provides more UV protection, but you can also use clear.

Start by cleaning the rails with denatured alcohol or mild household cleaner. Avoid harsh chemicals like acetone and methyl ethyl ketone. Then don a respirator and sand the rails and sawed ends to remove exposed fibers (**Photo 1**). Wipe the sanded areas with a tack cloth. Next, mask off the steps and braces. Prime and paint, making sure you spray the rail ends (**Photo 2**).

1 SMOOTH THE SURFACE
Sand the fiberglass with a nonmetallic abrasive pad or sanding sponge. Don't use ordinary sandpaper or emery cloth; the grit can embed in the surface. Continue sanding until you remove all traces of protruding fibers and achieve a smooth finish over the entire ladder.

2 PRIME AND PAINT
After the primer dries, apply two coats of pigmented acrylic lacquer or polyurethane paint.

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What homeowners MUST know

BY GARY WENTZ editors@thefamilyhandyman.com

ART DIRECTION **MARY SCHWENDER** • PHOTOGRAPHY **HSP** • ILLUSTRATION **STEVE BJÖRKMAN**

ARE YOU PAYING FOR UNNECESSARY COVERAGE?

Check your next homeowner's insurance bill for additional-structures coverage. Some insurers just assume that your house isn't the only building on your property. If you don't have a shed, detached garage or other buildings, drop the coverage and shave a few bucks off the bill—typically about 5 percent.

Check your dryer vent

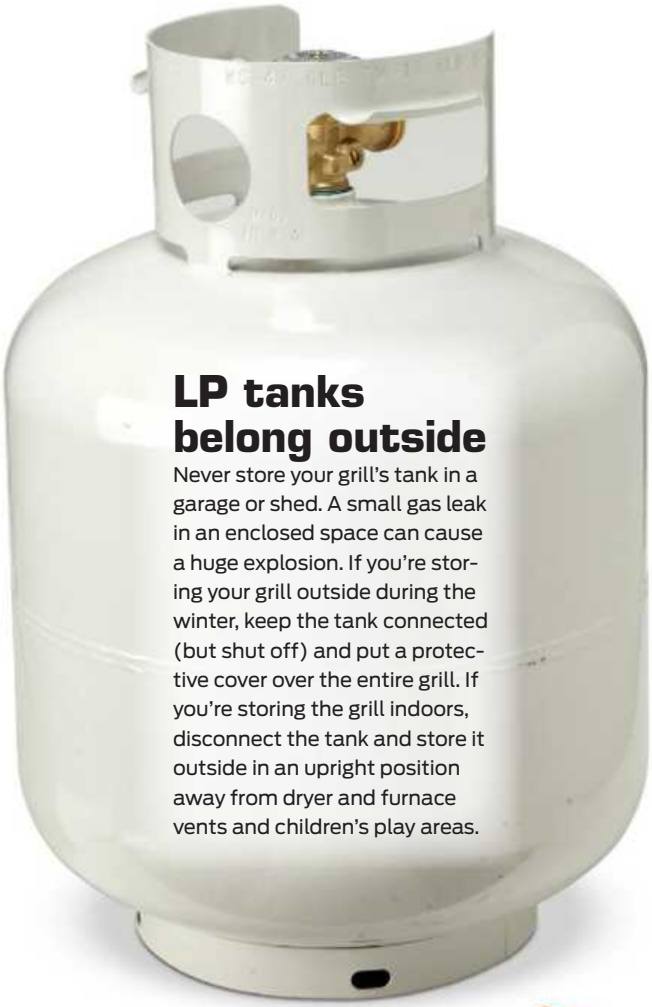
The next time you walk past that little hood on your dryer vent, reach up and flip the damper open. It should open easily then close completely when you let go. A damper that doesn't open reduces the efficiency of your dryer. Worse, it can lead to lint buildup and a fire. A damper that doesn't close lets in outside air and pests. Usually, you can free a stubborn damper just by swinging it open a few times or cleaning out cobwebs and other obstructions.

Winter storage for yard supplies

Keep fertilizer and seed dry and fresh until next spring by placing them in giant zip-top bags (available at discount stores).

PREVENT STUCK BULBS

A little corrosion makes a light bulb hard to unscrew. This is usually a problem in damp areas: outdoors or in garages or basements. The solution is grease. But you can't use just any grease—be sure to use a product intended for bulbs. You'll find it at some home centers and online for less than $5.



LP tanks belong outside

Never store your grill's tank in a garage or shed. A small gas leak in an enclosed space can cause a huge explosion. If you're storing your grill outside during the winter, keep the tank connected (but shut off) and put a protective cover over the entire grill. If you're storing the grill indoors, disconnect the tank and store it outside in an upright position away from dryer and furnace vents and children's play areas.

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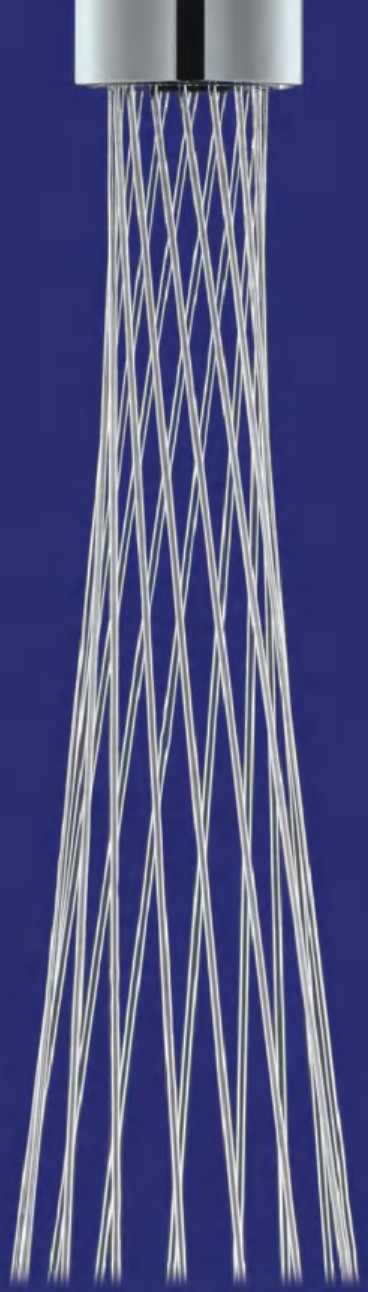

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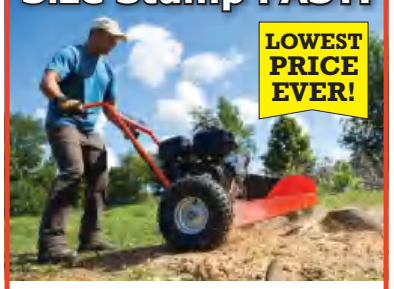

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FINISH FURNITURE ALL OVER

Wood expands and contracts as the humidity changes. And if you finish just the "show" side of a tabletop or cabinet door, the unfinished side will shrink and swell differently from the finished side. Within a few weeks, a nice, flat surface can go wild and wavy. To prevent this, apply a coat of finish on the unseen surfaces, too. That will equalize the effects of humidity changes.

The right place for owner's manuals

Manuals don't belong in a drawer. Keep them close to the item they came with. Slip the manual for your new fridge, for example, into a zip-top bag and tape it to the side of the fridge that goes against a wall. For bath or kitchen fixtures, bag the manual and extra parts and hang them on a hook inside a cabinet.

What's a backflow preventer?

Backflow or anti-siphon devices prevent water, and any chemical in your hose, from backing up into the water system. Usually all the plumbing in your house is under positive pressure. But in the event of a huge water usage—like when firefighters tap into a hydrant or a water main bursts—the plumbing can become negatively pressurized, sucking water out of your pipes and back into the drinking water system. If that water contains fertilizers or poisons, it could contaminate the water in your home and other homes.

Most outdoor spigots on newer homes have built-in backflow preventers. Add-on devices like the one shown cost about $12 and perform the same function.

GET A GOOD ROLLER SLEEVE

A cheap paint roller might save you five bucks, but it won't hold much paint, so you'll have to reload more often and the project will take longer. Worse, it will leave hundreds of tiny fibers on your wall. Ugly. Be sure to get a roller labeled "shed-resistant."

If the power goes out

- Don't use candles. Flashlights produce more light and won't burn your house down.
- Bring solar landscape lights inside. Don't forget to put them out for recharging during the day.
- Keep the fridge closed. The less you open fridge and freezer doors, the longer your food will stay cold.
- Tap your water heater. It's your built-in emergency water supply. Let the water cool before you open the drain valve at the bottom of the tank.
- Don't take chances. Power outages mean packed emergency rooms and delayed ambulance service; it's the worst time to get injured.

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BY RICK MUSCOPLAT editors@thefamilyhandyman.com

ART DIRECTION MARCIA ROEPKE • PHOTOGRAPHY TOM FENENGA

Before you cut your landline ...

7 reasons to think twice

Almost half of all homeowners in the United States have dropped their hardwired telephone service and rely on cellular service only. That saves money every month and might be a smart move for you. But there's more to it than money. We talked to tech experts and with homeowners who have cut their landlines and have lots of regrets. So before you cut the cord, consider these possible drawbacks:

1 **UNRELIABILITY.** If you're frustrated by problems like dropped calls, you might become even more frustrated when you no longer have a hardwired alternative line at home.

2 **SPOTTY RECEPTION.** Next time you're on your cell phone, walk through your entire house. If you get poor reception in some areas and still want to drop your landline, consider installing a cell booster system or a portable phone system with multiple extensions that works with your cell service. Go to familyhandyman.com and search for "cell booster."

You can keep your landline and lower your cost

You can save money and keep your landline by changing the services you receive. If you switch to a barebones "measured service" landline, you can drop unlimited local and long distance service and expensive features like voicemail, caller I.D. and call waiting. That way you'll have a wired phone line with a lower monthly fee, a set number of minutes, and 911 with location service for fast response in an emergency. You can use the landline to ring your cell phone when you misplace it and you'll have a backup when your cell phone battery dies or the cell network is overloaded.

3 **MISSED CALLS.** You probably have several hardwired phones in your home, so you can hear the ring anywhere and grab the nearest phone. With a cell phone only, you'll have to carry it around the house with you—or miss calls. (Not necessarily a bad thing, depending who's calling!)

4 **A DEAD PHONE.** If you sometimes curse because you've forgotten to charge your cell phone, think how much you'll curse when you have no hardwired backup phone.

5 **TECHNOLOGY LIMITATIONS.** Some technology requires a landline. Mostly, that means home security systems that dial out when triggered. But some thermostats, flood warning systems and other devices require a landline.

6 **SMALL SAVINGS.** Before you cut the cord, verify how much the service is costing you. The savings may be smaller than you think, especially if your service is bundled with Internet and TV service.

7 **NO EMERGENCY LOCATION SERVICE.** When you call 911 from a landline, the dispatcher gets your street address instantly. But when you call 911 from a cell phone, the dispatcher cannot tell where you're located. Although it's possible for the dispatcher to retrieve location coordinates from your phone's GPS or contact your cell phone carrier to get tower triangulation information, that can take a lot of time and yields iffy results that are only accurate to within 300 ft. of your home.

Cell phones are even less reliable in natural disasters because cell phone towers overload so quickly, and most 911 centers can't receive texts. Relying on your cell phone during an emergency means you're banking on being alert and composed enough to state your exact location. Plus, if you're unconscious, even a neighbor or relative who finds you may not know your exact address.

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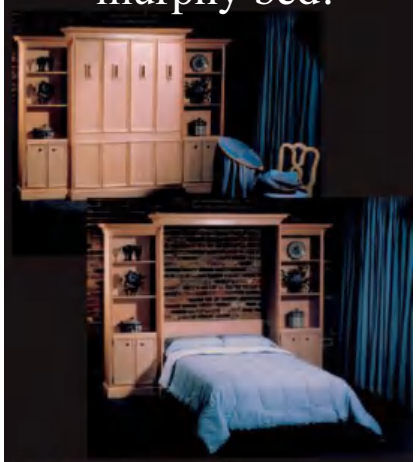

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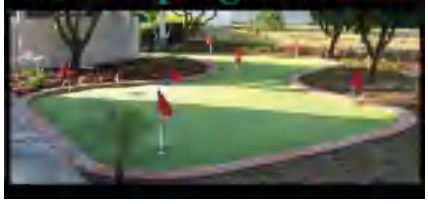

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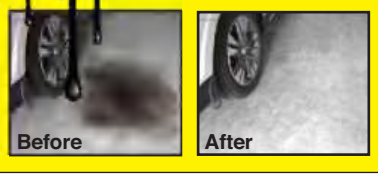

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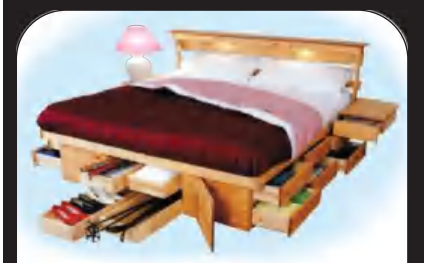

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FROM OUR READERS greatgoofs@thefamilyhandyman.com

PAINT-BUCKET BOMB

I was painting some windows high above my deck and needed to hang a paint bucket from my ladder. I'd fashioned a hook from some aluminum wire the day before to hold my tool bucket, so I figured that would do. As I was painting, the hook came unbent, sending the bucket plummeting and the paint exploding all over the deck below. The deck was in need of sprucing up, but this wasn't exactly what I'd had in mind.

Stan Dickerson

Blower-bag bungle

I was house-sitting for friends who have several huge trees in their yard, and I decided to take on the leaf cleanup. My dad's new leaf blower/vacuum seemed like just the right tool to suck up the leaves.

Leaves had collected on a porch off the kitchen, so I looked for an outlet, found one just inside the doorway and started vacuuming. The blower/vac sucked up the pile of leaves instantly. Then I caught something out of the corner of my eye: Mulched leaves were flying through the kitchen like confetti. I had forgotten to zip up the bag before starting the machine.

Darcey Ridgway

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See p. 4.

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